OCTOBER 1956
VOL. 51 NO. 10

VETERINARY Medicine

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Immunization of Chickens Against Infectious Bronchitis

Advances Made in Swine Practice, Part X: Chronicle of Progress

Treatment of Poisonous Snakebite with Cortisone Acetate

Survey of Adrenocortical Hormone Nomenclature and Dosage Form

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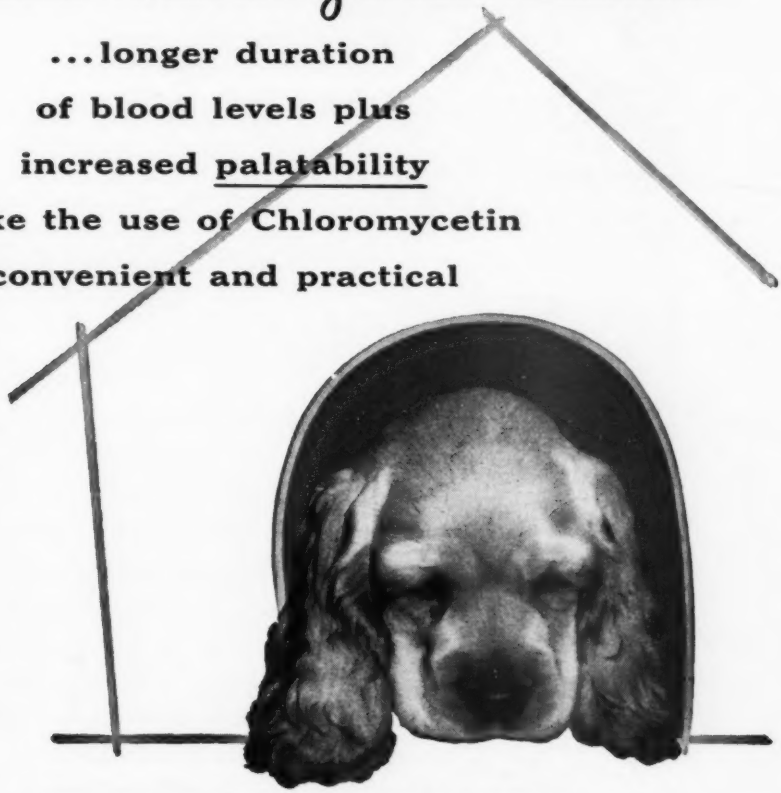

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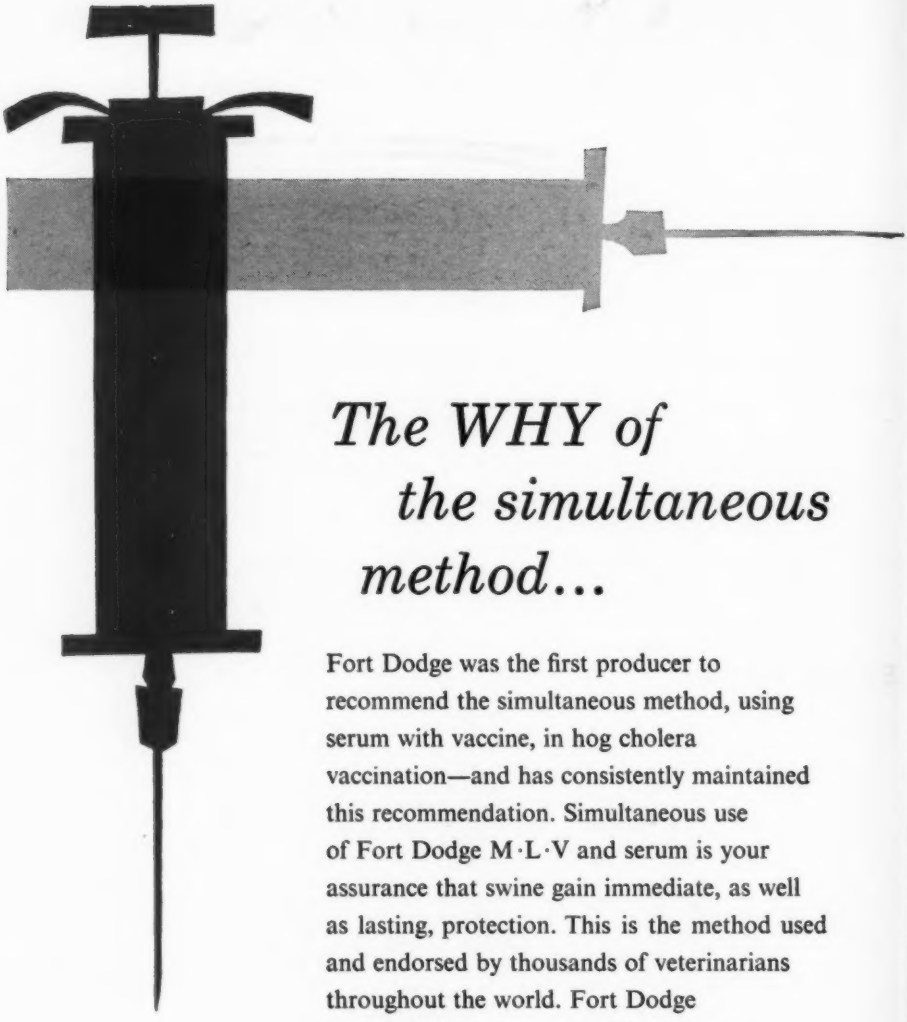

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The Public Health Aspects of Residual Penicillin in Milk

Results of extensive, nation-wide surveys by the Food and Drug Administration for three consecutive years have revealed evidence of measurable levels of penicillin in a significant percentage of milk delivered to consumers. Officials of the F.D.A., charged with protecting the public from contaminated and adulterated foods, conclude that present regulations are inadequate. Label warnings on mastitis preparations to the effect that "Milk from treated quarters should be discarded or used for purposes other than human consumption for at least 72 hours after the last treatment" are completely disregarded. The matter is of concern to the F.D.A. because of the facts of adulteration according to official definition. More important, however, is recognition that abuses of a commonly used chemotherapeutic agent are coming to be looked upon as a menace to the general health of the nation.

Specialists of the medical advisory panel, representatives of drug manufacturers, and other interested personalities were called for a conference in Washington, D. C., on September 10, 1956. Certain facts were brought out at discussions emphasizing the magnitude of the problem from a public health aspect. Among these was the estimate that more than 75 tons of antibiotics were used annually in the treatment of bovine mastitis; that 10% (estimate) of the population is exquisitely sensitive to penicillin; and that penicillin and decomposition products of this antibiotic are antigenic in minute amounts.

Conclusions of conferees was that insufficient evidence was available on which to base suggestions for eliminating completely penicillin from market milk. More data is to be gathered which will give a firm basis for practical solution to the problem. Certainly public health aspects will dictate action of the F.D.A.

A century ago William Haycock wrote, "Medicine unless given under the enlightened guidance of a law, is a hazard." This truism is pertinent to the penicillin-in-milk problem. Restrictive regulations are inevitable and may result in (1) prohibition of the use of penicillin in mastitis preparations, (2) requirements for additions of a dye not yet developed that will color antibiotic laden milk, or (3) restricting use to veterinarians or on prescription by a licensed practitioner. The latter is practical and sensible. It is also consistent from the standpoint of classification of drugs.

VETERINARY Medicine

Established 1905

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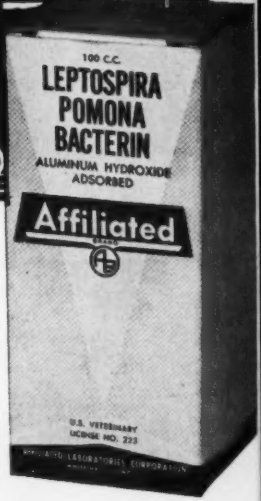

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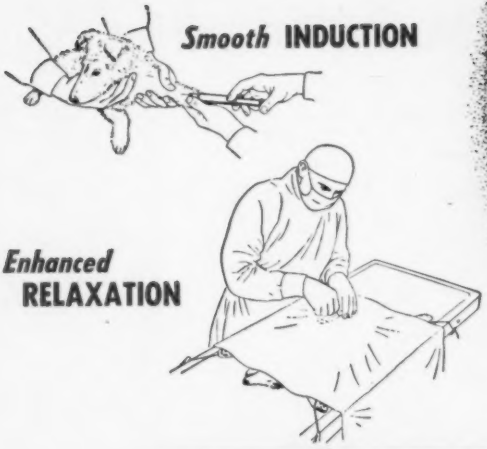

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(1) R. J. Deans, W. J. Van Arsdell, E. P. Reineke and L. J. Bratzler (Michigan Agricultural Experiment Station): The Effect of Progesterone-Estradiol Implants and Stilbestrol Feeding on Feed Lot Performance and Carcass Characteristics of Steers, *Jl. of Animal Science* (In Press).

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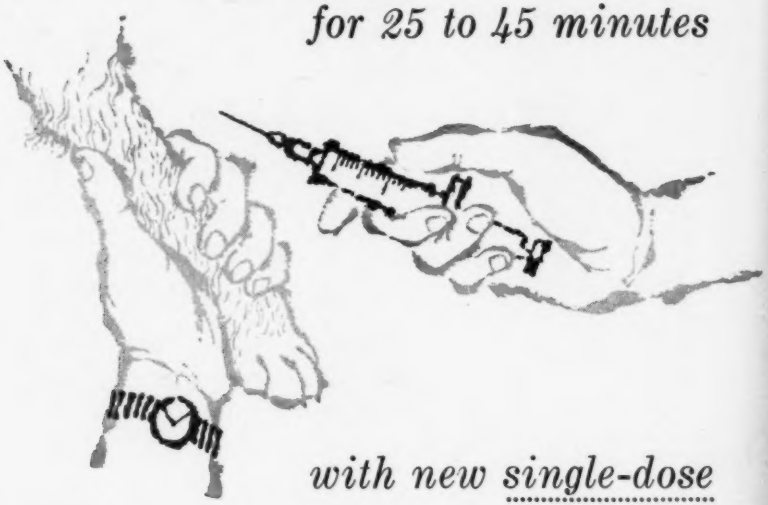

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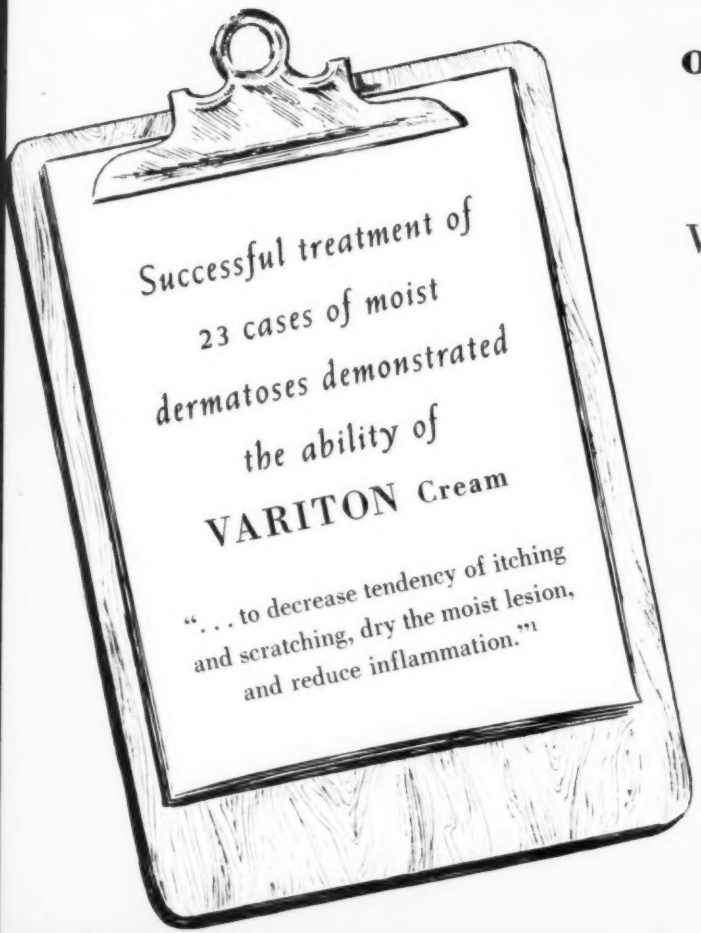
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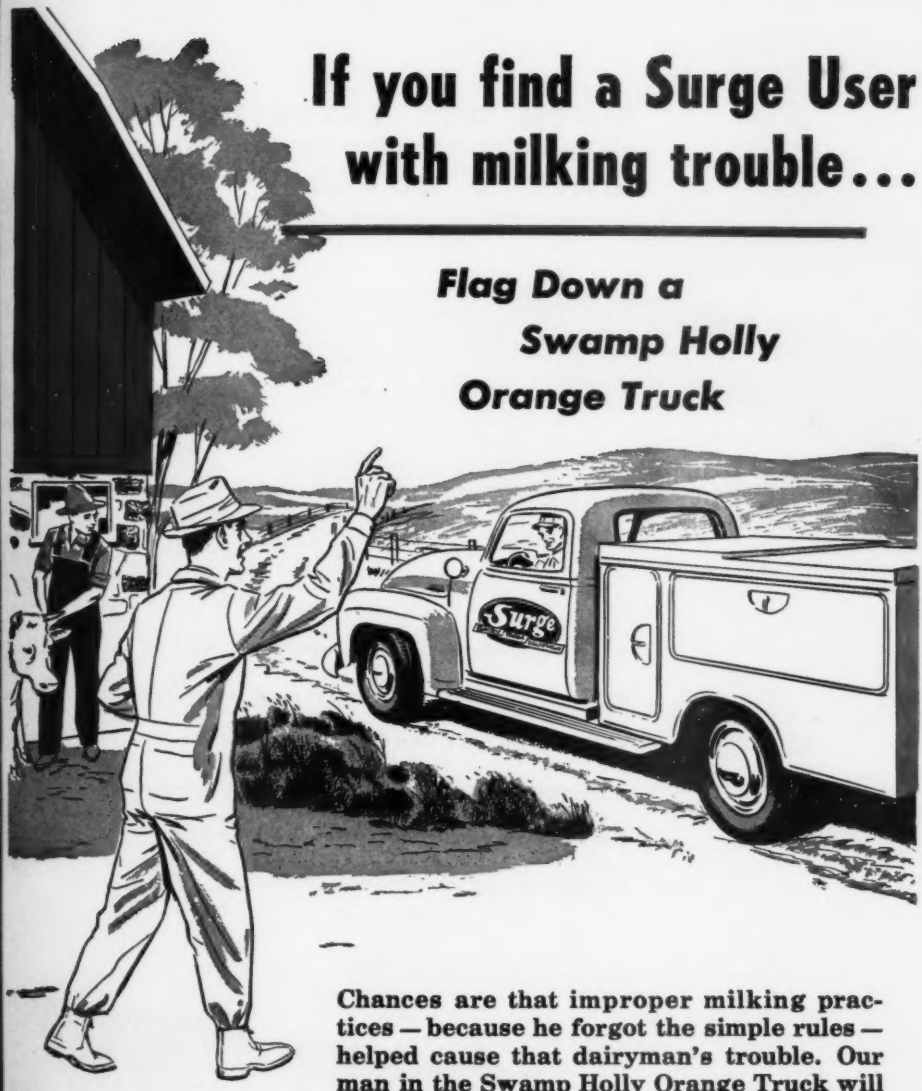

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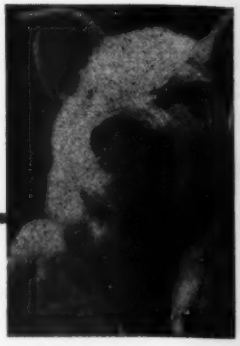

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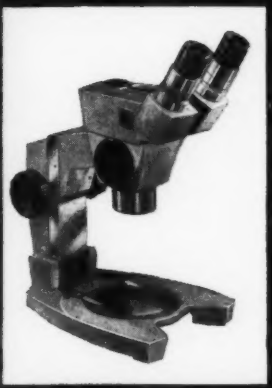

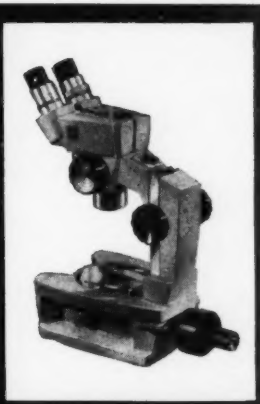

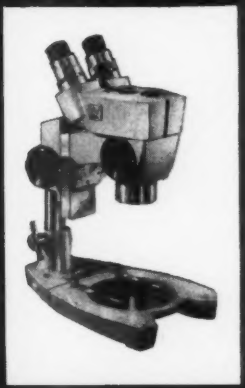

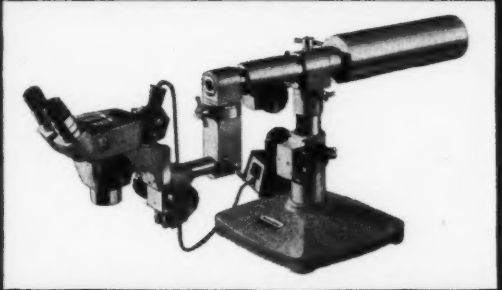

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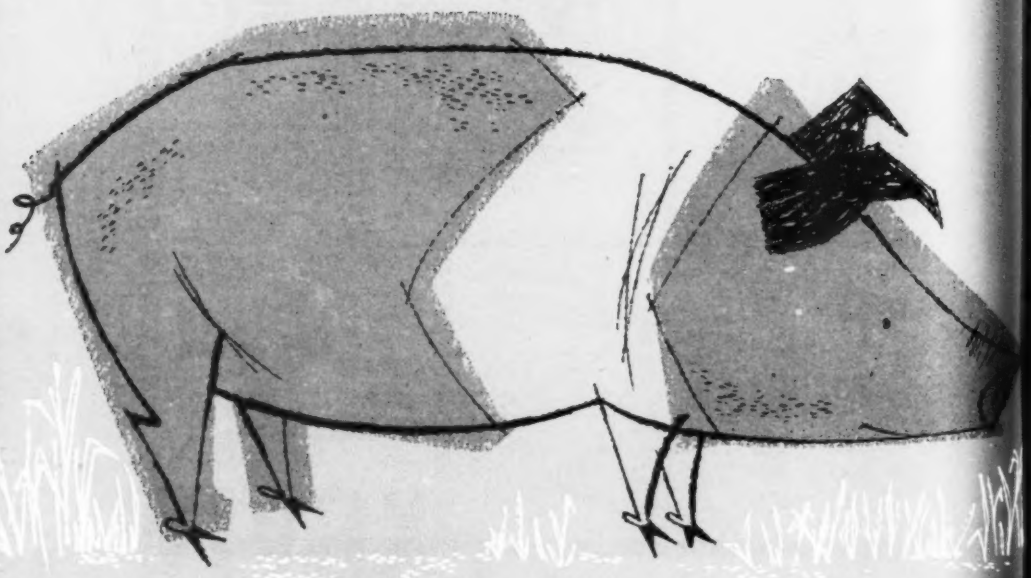

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Practical Nutrition For The Veterinary Practitioner†

MORRIS ERDHEIM,* D.V.M., Chicago, Illinois

THE veterinary profession recently has taken an increased interest in animal nutrition. Professional publications are devoting more space to the subject than formerly. Veterinary conferences list more talks in this field, and a movement to organize those veterinarians interested in nutrition on a national scale has met with singular success.

At the practitioner level, however, too little interest has been demonstrated in applying the newer information in this field to everyday practice experiences. By newer information, I refer to the well-balanced feeds and feeding programs nutritionists have devised for use by practical livestock and poultry producers.

Because of the misunderstandings that exist between veterinary practitioners and local representatives of the feed industry, a discussion of this phase of practical nutrition might be in order. The feed industry supplies practical nutrition in a bag. As practical veterinarians it seems to me that we would want to be familiar with the "nutrition" our clients buy. We might also find ways of adapting to our uses in the field, the products and programs the feed industry has made available.

Scientifically Designed Feed Formulae

Let us examine a modern feed formula and how it is designed into a balanced ration. The following is a typical 18% pig starter commercially available to the hog raiser. It incorporates the latest thinking of swine nutritionists.

This balanced feed is a long cry from the corn, tankage, and mineral combination which was fed hogs 25 years ago.

The nutritionists today no longer think primarily of supplying this or that ingredient

18% Pig Starter Formula

Ingredients	Wt. (lb.)
Vitamin-trace mineral mix	50
Rolled oats	300
Ground yellow corn	900
Cane or beet sugar	100
Cane molasses	100
Soybean meal (44% protein)	350
Tankage (60% protein)	100
Dehydrated alfalfa (17% protein)	50
Ground limestone	20
Bone meal	20
Salt	10
Total	2000

Calculated Analysis	
Protein, %	18.1
Fat, %	3.2
Fiber, %	3.2
N.F.E., %	56.8
Calcium, %	1.18
Phosphorus, %	0.64
Vitamin A, USP units/lb.	3,125.
Vitamin D, USP units/lb.	1,500.
Riboflavin, mg./lb.	1.89
Pantothenic acid, mg./lb.	8.33
Niacin, mg./lb.	20.2
Choline chloride, mg./lb.	560.0
Vitamin B_{12}, mcg./lb.	8.5
Antibiotic, gm./ton	10.0

†Presented at the 18th annual Conference for Kansas Veterinarians, Kansas State College, Manhattan, June 1-2, 1956.

*Doctor Erdheim is Director of Technical Development for the Dawes Laboratories and Department Editor for Veterinary Medicine.

(like corn for hogs) on an empirical basis, but rather of satisfying nutritional requirements, which have been carefully compiled. The ingredients used in the formula are selected and combined in such proportions that will supply these requirements. The calculated analysis of the formula then serves a double function. It guarantees the buyer given levels of vitamins, amino acids, and trace minerals. It also serves as a check that this formula supplies nutritional requirements for growth and fattening and that it is properly balanced.

Not only does the science of nutrition supply the practical answers regarding what feeds are best for practical husbandry, but it also supplies carefully studied feeding programs. These are designed to supply the most practical approach modern nutrition can offer the feeder under different economic conditions. There are times when fast growth is most practical. At other times, slower growth is most practical because more economical gains can be made by using lower energy ingredients which are available at good prices.

Medication of Feeds

Another development which should attract the veterinarian's attention to the newest trends in livestock feeding is the evergrowing list of medicated feeds being made available to the livestock and poultry industries.

These fall into a number of categories. Among those classified as growth promoters are included: Antibiotics, arsenicals, nitrofurans, and other antibacterials. These are added to the feed at low levels. Under most field conditions, a significant growth response and increased feed efficiency can be demonstrated readily.

Another group is the disease preventive and therapeutic feeds. These are made up with the same drugs as the first group but used at higher levels for disease prevention or treatment. Also included in this group are the coccidiostats and so-called wormers.

In addition to these are special medicated feeds. These include sodium propionate for acetonemia control, antifoaming agents for bloat control, and high-level vitamin D for milk fever prevention. A classified listing of those medicaments commonly employed as feed additives is provided.

Whether we like it or not, medicated feeds are here to stay. It is obvious that the trend is growing. There is no question about the extremely beneficial effect these agents have had on the economics of raising poultry and livestock. We can not wish them out of existence.

Medicaments Used as Feed Additives

1. Growth Promoters.
   - (a) Antibiotics—
     1. chlortetracycline
     2. bacitracin
     3. penicillin
     4. oxytetracycline
   - (b) Arsenicals—
     1. arsanilic acid
     2. 3 - nitro-4-hydroxy-phenylarsonic acid
     3. sodium arsanilate
   - (c) Hormones—
     1. diethylstilbestrol
     2. dienestrol diacetate
2. Coccidiostats.
   - (a) Sulfonamides—
     1. sulfaquinoxaline
     2. sulfaguanidine
     3. sulfamethazine
   - (b) Nicarbazin
   - (c) Nitrophenide
   - (d) Nitrofurazone
3. Antibacterials for Disease Prevention and Treatment.
   - (a) Antibiotics—
     1. chlortetracyline
     2. bacitracin
     3. penicillin
     4. streptomycin
     5. oxytetracycline
   - (b) Arsenicals
   - (c) Nitrofurans-Furazolidone
   - (d) Amino nitrothiazole
   - (d) Trimethylalkylammonium stearate
4. Worming Compounds.
   - (a) Nicotine sulfate
   - (b) Phenothiazine
   - (c) Sodium fluoride
   - (d) Cadmium
     1. anthranilate
     2. oxide
   - (e) Piperazine salts
   - (f) Dibutylin dilaurate
5. Medicaments for Special Purpose Feeds.
   - (a) Sodium propionate (antiketosis feeds)
   - (b) High level vitamin D (anti-milk fever feeds)
   - (c) Methyl silicone (anti-bloat feeds)
   - (d) Procaine penicillin (anti-bloat feeds)
6. Non-medicinal Additives.
   - (a) Antioxidants
     1. BHT
     2. DPPD
     3. BHA
     4. santoquin

(b) Enzymes
(c) Surfactants
(d) Urea
(e) Bentonite

Since this is a sore point with most of us, it might be well to discuss it at some length. How did the use of medicaments in feed begin? A number of reasons are given. One of the most important is our own indifference to poultry practice.

The poultry industry is highly developed on an efficient basis. Poultry feeds represent a little over 60% of all the bag feed sold in the United States. Much of this is sold on a "financing plan" with the feed man holding the bag. It is in the feed man's interest to have the best management and best veterinary service available to those growers. Because the veterinarians have shown a disinterest in this practice, other methods of self-protection were sought. One was the training of lay "service men," the other was the enthusiastic reception given to medicated feeds. These feeds help often enough, used on a shotgun basis, to encourage their extension.

Another comment on medicated feeds is in order. These medicaments are usually added in small amounts. A fraction of a pound to four pounds mixed in a ton of feed is the usual range. The feed manufacturer has the equipment and technological know-how to do this micromixing. It would seem logical to let him do this job, and find some reasonable approach to the problems of ethical distribution—particularly where treatment of disease is concerned. In other words, our objection to medicated feeds is not in the feed itself or in the feed manufacturer's mixing, but rather in their use for treatment without benefit of diagnosis by a competent veterinarian.

Feed Industry

A discussion of practical nutrition must necessarily involve itself with the feed industry and its activities. The latest developments in nutrition are translated into practical feeds and feeding programs by the feed industry. Commercially mixed feeds have contributed significantly to the remarkable results in the feedlots.

Getting a hog to market at eight months was the expected goal 25 years ago. Moreover, raising six pigs per sow was a good average. Today, hogs are marketed at five months of age, and a good hog man will raise eight pigs per sow. Even more dramatic changes have taken place in the poultry and turkey industries.

Unfortunately, there has been much misunderstanding between feed industry people and veterinarians. Our impression of the feed industry is based largely on our familiarity with itinerant salesmen representing fly-by-night companies. We also run into problems associated with over-zealous feed salesmen or service men whose ignorance of pathology and medicine do not prevent them from attempting to diagnose and treat disease conditions.

No apologies are offered for these. The first group does not represent the modern feed industry any more than the unscruplous quacks represent organized veterinary medicine. The feed men would much prefer their service work done by trained veterinarians than by lay personnel.

The feed industry is well-organized and represents reputable manufacturers who are sincerely interested in providing the latest nutritional thinking in each bag of feed they sell. They spend many thousands of dollars each year in private research and as grants-in-aid to college laboratories. The Feed Mill Technology School on the Kansas State College campus stands as a tribute to their desire to provide new information and trained personnel for the general good. It was wholly financed by contributions provided by members of this industry.

This background, sketchy though it is, is given in the hope that the suspicion which may be present in your minds would dissipate enough to consider working with the feed people at the local level, for mutual benefit which ultimately reflects itself in improved service to the livestock industry.

Veterinary-Feed Man Cooperation

One of the important results of a friendly relations program with the local feed man is the clarification of his role as a feed supplier as compared to your role as the veterinarian in the field. By placing each man's activity in proper focus, the feed man can be discouraged from further attempts to diagnose and treat diseased animals or birds. He would rather have a competent veterinarian on whom he could depend for service work in herds and flocks for which he supplies feed. This is particularly understandable when we recall that much of this feed is sold on a "finance plan" which he finances. It is obvious that he would prefer a good veterinarian to a layman to service the account, if only to protect his in-

vestment. This kind of "education" program can be successfully carried out by veterinarians at the local level when the atmosphere is friendly. The practitioner is in a better position than any other individual who calls on the livestock owner to "sell" a sound nutrition program. He is the only man the livestock owner pays for advice and guidance. The feed man would gladly forsake his "treatment" business, once he appreciates how much the veterinarian means to him in this regard[1].

A competent veterinarian can also minimize the feed man's problem when his feed is blamed for some disease condition. The veterinarian who diagnoses the condition correctly can avert the "your feed killed my pigs" story which sometimes is used by a feeder. Few cases of trouble in herds or flocks can actually be traced to feed mixed by a reputable company.

The reputable feed companies all supply literature with descriptions of their feeds formulae and feeding programs. While these are advertising pieces, they are instructive.

Most of these booklets are written for the practical feeder, but they can be meaningful to practitioners. With their professional background in biochemistry, physiology, and pathology, references to amino acids, vitamins, minerals, et cetera, have added meaning. Practitioners are thus assisted in understanding of the scientific aspect as well as the practical approach being described.

It appears reasonable that a familiarity with the feeds and feeding programs sold in our practice areas can be helpful in making a diagnosis. What may look like a primary deficiency disease, may actually be a case of failure to follow feeding directions. In this respect the feed industry might be pictured as another supplier of a useful tool for service to clients.

The pharmaceutical industry supplies drugs of a complex chemical nature. Practitioners rely on the scientist who developed them, and follow instructions and recommendation in their use for specific conditions. The nuclear physicist supplies radioactive materials which assist in a variety of ways in everyday practices, this, without our being experts in Einstein's theories.

The feed industry similarly supplies us with the means to help our clients in their search for an improved economic picture through better herd health. The veterinary-client relationship established over the years is such that it behooves the practitioner to know how to advise on nutritional problems. Sound nutrition programs for the prevention of disease and malnutrition and the maintenance of poultry and animal health should be as routine as vaccination programs for prevention of infectious diseases. The practicing veterinarian is a key man in this picture.

Medicated feeds present a real challenge. The big problem is not mixing, but ethical distribution. A friendly relationship between the practitioner and the local feed man could result in the veterinarian's prescribing the appropriate medicated feeds after making his diagnosis—or he may prescribe a special feed and feeding program[2]. This approach is being used successfully, particularly in some poultry practices. Another approach is to dispense a medicament for the feed man to mix into a particular feed. This too is being done[3]. In any case, medicated feeds are here to stay. More of them are bound to be developed. The problem can not be solved by ignoring their existence. By such indifference poultry problems were forced into lay hands; the potential stake in medicated feeds is even greater.

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▼ ▼ ▼

Eliminating Broader Cows

Though the number of milk cows for the period 1947 to 1955 decreased from a total of about 26,000,000 to approximately 23,333,000 in the United States, the amount of milk produced during the same period is in a large measure indicative of the value of approved sires in the artificial insemination program. Almost of equal importance is the greatly improved technic in the handling, collection, and processing of semen, such as lower storage temperatures, the addition of antibiotics, et cetera. Also, the persons charged with the actual insemination have learned that the best time to fertilize the ovum is comparatively late during estrum. Veterinarians in their much more expert handling of general and genital diseases have contributed much to the entire program.

▼ ▼ ▼

Forty types of Salmonella have been found to infect chickens.

General Considerations In Large Animal Surgery†

E. F. EBERT,* D.V.M., Columbia, Missouri

NO attempt will be made at this time to outline detailed descriptions of various surgical procedures already familiar to you. Instead, I will try to point out some features that may serve as an exchange of ideas. Some points concerning surgical technics, selection of cases, preparation, the process of healing, and aftercare might be of value.

Too often one is inclined to hurry and not obtain sufficient history or examine patients with sufficient thoroughness prior to what may be simple surgery. Such instances as castrating calves too soon following a bout with shipping fever or operating colts following an outbreak of influenza or distemper may prove embarassing. Avoid poor surgical risks but if owners insist be sure that dangers involved are carefully explained.

Fasting animals prior to surgery, in those cases where time will allow, is of definite advantage to both patient and surgeon. Then too, one may wish to employ some form of medication prior to surgery to assure successful results.

We read in old surgery textbooks about cleaning the operative field of hair and debris and applying an antiseptic pack 24 hours prior to surgery. I think there are selective cases where this can be used to advantage. It is quite obvious that in many cases this is impractical or impossible. However, such cases as infected interdigital tumors in cattle or in the amputation of a digit where there is severe infection involving the tendons or joints, this procedure can be used to good advantage. Any foot or leg surgery, below the knee or hock in cattle or horses lends itself to use of moist antiseptic pack.

Those of us who do large animal surgery are somewhat handicapped or limited in selection of most appropriate technics. The environment or operative terrain plays an important part in such planning. Most surgeons are inclined to neglect or overlook a few surgical procedures which might affect results or shorten surgical recovery.

†Presented at the 72nd annual convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 11-13, 1956.

*Director of Clinics, School of Veterinary Medicine, University of Missouri.

Trauma

Surgery is a premeditated, measured, ingenious form of trauma, with the explicit purpose of ablating certain diseases or anatomical defects in animals or man. The surgical process from the beginning of the incision to the final closure is a succession of steps, each and every one of which is a form of trauma.

Surgeons are well aware of the fact that in the presence of a fractured and comminuted femur, undue chiseling, hammering or drilling may precipitate shock. It is equally well understood that much of the stormy postoperative experiences following abdominal surgery are not infrequently due to excessive manipulation of abdominal contents. These are extremes of an ever present reality; the difference being only a matter of degree. Since there can be no circumventing the basic truth that surgery is trauma, it is important that no effort be spared to avoid unnecessary pulling, dissection, tearing, bleeding, sponging, and rough grasping of tissues with hemostats. I am convinced that one of the greatest hazards to successful surgical repair is unnecessary trauma, resulting in delayed healing.

Trauma will be diminished by the surgeon who has developed a good technic and who naturally will become more gentle and steady in his actions. Process of repair in the uncomplicated wound may be discussed briefly as consisting of three phases:

1. The first reaction is the outpouring of an exudate consisting of plasma, blood cells, and liberated fibrin which fills the gap in the wound. This is the lag period and lasts from four to six days.

2. The second phase begins with the appearance of fibroblasts and new vascular buds. These multiply rapidly to fill the gap and restore the continuity of the wound edges. The speed of growth starts abruptly at a maximum and progressively diminishes in rate until the end of the fibroplasia period on the tenth to 14th day.

3. The final phase is the formation of firm adult tissue or scar.

Experimental and clinical work has firmly

established that the basic and essential requirements for normal healing of a wound are: (1) A state of positive nitrogen equilibrium; (2) a normal fluid and electrolyte balance; and (3) adequate concentration of vitamin C.

Protein is the basic constituent of protoplasm and consequently of all tissues of the body. During starvation or upon a nonprotein diet a negative nitrogen balance results which is manifested clinically by retardation of growth. Since wound healing is a biological phenomenon conforming to the laws of growth, any deficiency in the protein content of the body will affect the rate and extent of repair of tissues after injury.

In healthy animals nearly 70% of the body substance consists of intracellular and extracellular water. Of the electrolytes, sodium, calcium, potassium, and magnesium are the most important in the form of chlorides. There are efficient laboratory methods of measuring these but are too complex for use in the field. What we are most concerned about are the effects of a loss and imbalance and conditions which contribute to these effects. Any loss in volume of fluid such as from severe hemorrhage or diarrhea, and to a lesser degree sweating and exposure of abdominal organs to chilling, drying out, and trauma will result in an electrolyte imbalance. This distribution of water and electrolytes within the body is described on the basis of the classical theory of chemical and osmotic equilibrium between body compartments. This theory provides a rational basis for clinical work.

Of the vitamins, ascorbic acid is an essential requirement for the production and maintainence of intracellular cement which is composed largely of collagen. Just how important this is in animals is unknown. In the ruminant, vitamin C is normally synthetized in the body, however work is now being done to determine the vitamin C content following major surgery.

Now what can we do to overcome some of these problems and assist nature in wound repair?

The first consideration to help diminish the possibility of shock is adequate and safe anesthesia. Just how much emotional stress from pain and fear precipitate shock we do not know but we do know that it is highly important. Veterinary surgeons have avoided general profound anesthesia for cattle and horses. Instead we have perfected and employ regional and local anesthesia including: Paravertebral block over infiltration, digital block in horses, digital block in cattle, pudendal block, sedative dose of choral hydrate intravenously.

Utilization of the sulfonamides and antibiotics to inhibit growth of bacteria is well established, however, they are not entirely effective in combating wound infection. The application of sound surgical principles is still the most important method of preventing wound infection.

I do not believe in shaving the surgical field. Close clipping will suffice, then thorough brushing the area followed by scrubbing with neutral soap and warm water. Rinse the soap off, dry and clean with alcohol or ether (fat solvent) and follow with a suitable skin antiseptic. Do not use tincture of iodine on the surgical area. Any phenylmercuricnitrate preparation is recommended.

Fluid Balance

The use of 5% dextrose (2,000 cc. in a 1,000-lb. animal) intravenously during surgery or a normal electrolyte solution will aid in the reduction of the possibility of surgical shock. This normal electrolyte solution is the result of the work done by Doctor McSherry and his colleagues in Ontario. It contains sodium, calcium, potassium, and magnesium chlorides. The work done was that primarily in the treatment of calf scours. In poor surgical risks, blood transfusions of course are desirable. Injury to the tissues causes a release of histamine which also contributes to shock. Antihistamines may be given with intravenous drip of solutions or blood. Clinicians have reported a great reduction of those cases where systemic reactions occur with the use of blood transfusions by substituting plastic tubing for the rubber tubing. In instances of suspected protein deficiency, blood or the injectable amino acids are also recommended.

Some Useful Surgical Rules

For skin incision use a sharp knife and make a bold incision; discard the knife used for the skin incision. Incise where there will be the least amount of stress or pull on sutures that will bring wound margins into apposition.

Utilize the surgical pack, gloves, shroud.

Review anatomy so you will know what tissues you are cutting through. Do not rely entirely on Sisson; study during autopsy.

Grasp only a small amount of tissue with hemostats and avoid traumatizing fat. Ligate all blood vessels.

(Continued on page 470)

The History Of Some Current Problems In Animal Disease. IV. Tetanus

J. F. SMITHCORS,* D.V.M., Ph.D., East Lansing, Michigan

FROM ancient times, tetanus has been recognized as a problem common to human and veterinary medicine alike. The fourth century veterinary writer, Vegetius, characterized the disease as the "oaken distemper", sufficient evidence that he recognized the "sawhorse attitude" of modern descriptions. The Byzantine veterinarians of this era recognized the relation between wound infection and tetanus, but failed to see the connection with soil infection. The most common method of handling a tetanic horse was to bury him to his head in warm sand, or in a dung heap. Except for the now-obvious lack of insight into the nature of the infection, this method probably was about as effective in "tranquilizing" the animal as the laborious technics of the 19th century which had the same object. Because many of the cases identified as tetanus, by both physicians and veterinarians until relatively recent times were confused with other tetanic or paralytic states, little faith can be put in the claims of cures. It can be said, however, that the more dependable writers freely admitted a high mortality. Until the discovery of the tetanus bacillus and the resulting antitoxin late in the 19th century, little progress had been made in the handling of tetanus†. But even today, when prophylaxis is an accomplished fact, treatment remains in a less than satisfactory state.

Review of Literature

What is perhaps the earliest record of tetanus in animals is the statement by Aristotle in his History of Animals (*ca.* 300 B.C.) that, "The tetanus (Gk *tetanos*—a stretching) is another disease of horses, which is thus recognized; all the veins, and the head and neck are extended, and their legs are stiff when they walk." Perhaps as an association with the stiffness, tetanus was attributed to chilling, especially after the animal was overheated, an idea which persisted to the 19th century. While the Byzantine veterinarians recognized a relationship to puncture wounds of the foot, and Vegetius with castration, both considered the actual cause to be cold; thus the most common treatment, that of supplying warmth, even by burial in a dung heap, had a species of logic. An incomprehensible technic of the type that later became the farrier's delight, was that mentioned by Pliny (first century A.D.), who relates that the disease "is much eased by issuing into the eares the urine of a shee goat, or with a liniment made with their dung."

Although the earliest medical writers understood tetanus but poorly, in 400 A.D., Aurelianus gave a good description, and for the times, a rational regimen for handling tetanus. Expressing surprise that Hippocrates should have prescribed cold baths, he recommends keeping the patient warm and comfortable, the application of warm oils and hot poultices, along with the inevitable venesection, purges, and diuretics. Nourishment should be provided, but "do not use wooden wedges to open the jaw." Various gruels are suggested, but the frog soup recommended by some physicians, "is offensive and brings no advantage which reason can attest." Farriers to the 19th century devised ingenious methods of opening the jaws, the better to pour their filthy pharmacopeia down the throats of their unsuspecting patients.

Archaic Treatment

The lay veterinary writer of the 16th century, Thomas Blundeville, says that horses that were thought by farriers to be "taken", "bewitched," or "planet struck," actually suffered from catelepsy due to cold, and prescribed the ancient dung pit. Later in the same century the evil Gervase Markham, whose muddled writings plagued veterinary practice for three centuries, describes tetanus as a "cramp or convulsion of sinews." If it arises from a prick or a half-cut sinew, "search for the sinew so pricked or cut, and with a pair of shears clip it asunder, and the convulsion will cease." The heavy hand of Markham may be discerned in a Dictionary of Husbandry

*Department of Anatomy, College of Veterinary Medicine, Michigan State University.

†A good summary and bibliography of the more recent history of this disease is contained in an article by N. D. Booth and R. E. Pierson, *Jour. Am. Vet. Med. Assn.*, 128:257, Mar. 1, 1956.

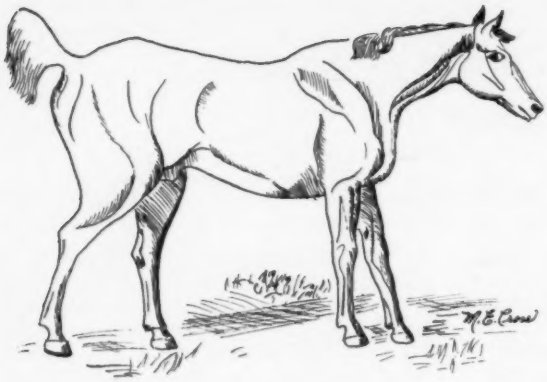

Fig. 1. Tetanus in the Horse. William Youatt: The Horse. 1831.

(1726) "collected from the best modern writers," in which we are assured that cramp (tetanus) may be recognized by the diseased beast being "so stiff, that the whole strength of a Man is not able to bow him." The cure is to "sweat your Horse well in an Horse-dung-hill, only with the head out," then rub the animal with a mixture of hogs-grease, turpentine, pepper, and wax. Sweating the animal was resorted to through the 19th century, but the dung heap was replaced by woolen clothing, and in the 1850's the homeopathic veterinary surgeon, William Haycock, devised an elaborate vapor bath for horses.

Reports in Early Veterinary Journals

The popularity of the writings of men of Markham's stripe prevented serious study of the diseases of animals until the late 18th century, after the establishment of veterinary schools. The first adequate reporting of animal disease awaited the founding of the French and British veterinary journals in the third decade of the 19th century. While the reporting of veterinary statistics a century or more ago can not be compared with that in medicine, some idea of the magnitude of the problem of tetanus can be gained from the reports which do exist. The incidence of tetanus after castration was such that a horse which had recovered from the operation was, in some areas, worth twice as much as before. Some castrators were considerably more successful, but there are reports of losses exceeding 90%. A mortality of the same magnitude has been reported following the castration, centuries earlier, of boys for church choirs. Many of these were shipped to Africa, where following the operation, they were buried to the waist in the warm sands of the Sahara; tetanus undoubtedly exacted its share of the toll.

One of the earliest writers to refer to the disease as tetanus was Delabere Blaine, whose Outlines of the Veterinary Art (1802) may be considered to be the first reasonably scientific exposition of veterinary practice in English. Other writers of this period continued to identify the condition as locked jaw, cramp, or stag-evil; the origin of the latter term is obscure, either affected animals were thought to have the bearing of a stag (deer), or the condition was supposed to be a common affection of wild stags. Blaine recognizes wounds as the principal cause, but says idiopathic tetanus may arise from excessive heat or cold, or from worms. Farriers, Blaine says, understand the disease imperfectly: "they prescribe a ball twice a day, when even a drink can seldom be got down." Blaine was one of the first veterinary practitioners to recommend the use of the newly invented stomach tube for the administration of medicines and nutritive fluids in addition to its more common use for relieving tympany. He used opium, ether, camphor, brandy and ale as antispasmodic and tonic drenches or enemas. This appears to be one of the first references to the use of ether for tetanus; ether was not used, to any extent at least, in human practice until near the mid-century. And while re-docking had been employed in cases following docking in the belief that it was nerves that were affected, Blaine, in a more prophetic anticipation of the neurotropic nature of the toxin, recommended neurotomy in cases arising from prick wounds of the foot.

Beginning with the first issue in 1828, all of the early volumes of the *Veterinarian* (London) contain articles on tetanus. In the volume for 1835, there are six major articles, including a transcript of the lectures on tetanus given by the eminent William Youatt at the

University of London. This series, incidentally, appears to have been the first substantial recognition of the budding veterinary profession by a medical group in a university. Youatt's lectures give a complete resumé of earlier and current knowledge of tetanus, and thus are worth considering at length.

Much of the difficulty in treatment, Youatt says, arises from the belief of grooms that the early signs are those of sore throat, and they do not seek veterinary advice until the horse cannot eat and has lost much flesh. Considering the heroic treatment characteristic of the times, it is small wonder that the veterinarian should be dismayed at having the horse turned over to him in this condition. The classic symptoms of tetanus in the horse are faithfully reported by Youatt. He is justly severe on Hinds' Farriery (1827), in which the author states he saw a case in which, "The eyes of the animal were turned back, shewing the nerve which retained the ball in position in a very disgusting manner." Youatt states that this is impossible, but then, "Mr. Hinds' book contains some very strange things."

Youatt does not give precise statistics on his total cases, but his reports are strongly suggestive that the nature of the disease has not changed much. Udall (1947) records a mortality of 60% or higher, and that the administration of antitoxin has little effect. The fact that better results were reported by numerous reputable writers a century or more ago should not necessarily be taken to mean that their heroic treatment was superior to the handling of the disease today. Rather, it is likely that many of these earlier reports were the result of mistaken diagnosis or poor memory. Whether the difference in the incidence of the disease would have any bearing upon its morbidity would be difficult to determine. One curious circumstance is that British reports of a century or more ago record few cases of neonatal infection. At the same time in some areas of America, tetanus claimed nearly half of the children who died under two weeks of age. Inasmuch as the relation of filth to the incidence of tetanus had been established conclusively before 1800, the implications of these statistics for the newborn are not a little appalling.

Always strongly insistent upon postmortem examination, Youatt says, in tetanus, "You will be grievously disappointed." While he had examined the brain and spinal cord carefully in a number of cases, he suggests to his medical audience that they might be better able to throw some light upon the matter, for, "I do not believe that the spinal chord of one horse in twenty, that dies of tetanus, is carefully examined: the knacker is always in a hurry, and the examination would be a matter of impossibility at the stable of the owner. We have scarcely upon record an examination of the postmortem appearance of the spinal chord of a tetanic horse, and most certainly we have not one satisfactory one. We must wipe off the disgrace."

Youatt's Treatment

On the matter of treatment, Youatt recognizes that "this is a most unsatisfactory portion of my subject," but that "the indication of cure is plain enough: *the system must be tranquillized* . . . every veterinary surgeon, I believe, has found this to be an exceedingly difficult affair; and we have failed oftener than we have suceeded." Youatt places primary dependence upon copious bleeding—in spite of his doubts about the propriety of heavy bleeding under most circumstances. By this means, "You take away the pabulum of the nervous and muscular systems . . . I have more than once taken away 20 pounds of

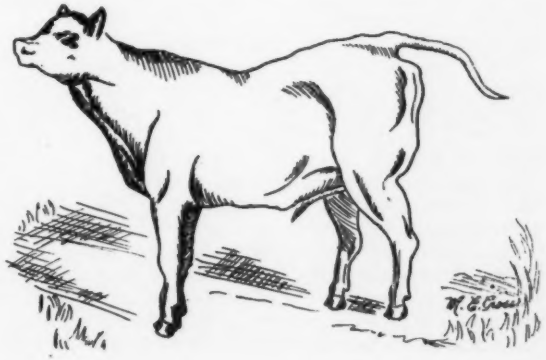

Fig. 2. Tetanus in the Cow. Youatt and Martin: Cattle. 1859.

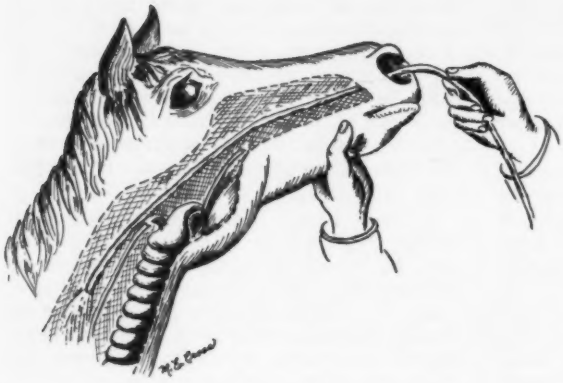

Fig. 3. Test for tetanus (movement of third eyelid), and method of feeding tetanic horse via stomach tube. Adapted from Manning's Horse Book. 1880. Fig. 1-3 were drawn by Miss Mary Ellen Cross.

blood, before I could accomplish my object; but I have uniformly persisted, and sometimes to the great terror of the owner . . . The grand principle of veterinary practice . . . is to subdue inflammatory action by the promptest and most efficient means — depletion . . . while the pulse remains firm, bleed on."

Other treatment consisted of "large and repeated" doses of physic, generous use of clysters of soap suds and Epsom salts, and the administration of opium, which Youatt insists is sedative to the horse without being narcotic. Opium in large doses—as much as two drachms three times a day—is "my sheet-anchor in the treatment of tetanus." Youatt does not state how he managed to get the mouth open to administer his doses, but in spite of the fact that he was dedicated to the humane treatment of animals, he relates a method advocated by Hinds' Farriery which he thinks might be of some use: "Place a piece of wood on the forehead of the horse, and strike a smart blow upon it with another piece or a small mallet. The jaw will immediately be relaxed, and some substance may be placed between the teeth, to prevent their return to their former closeness." The same advice appears in an American edition of Hinds (1847). An equally ingenious method was that used by a farrier (*Vet.* 1835) to open the jaws of a horse after all other attempts had failed. A cord was tied to the lower jaw, the other end to the smithy's vise, and a gun fired over the horse's head. The animal reared backward, followed by the vise, bench and tools, "and the next minute, he lay dead in the smithy. The jaws becoming relaxed in consequence of the death of the horse, it was sagely remarked by the operator, that he had cured the disease; but that the animal not possessing sufficient strength to undergo the operation, had died under it, which would not have been the case if he had recourse to it sooner." The technic preferred by Youatt was the use of the stomach pump, the tube of which can be introduced "between the tushes and the grinders," and by means of which the animal can be fed on gruel. Common treatments in which Youatt has little faith are: Blistering the back, asafetida, injections of tobacco smoke or infusion per rectum, and the application of cold. Concerning the practice of turning affected animals out in the cold, Youatt says, "there is too much apparent barbarity about it." He admits to having once tried continuous applications of cold water by relays of men for 24 hours. Youatt ruefully says, "It was cruel work . . . the poor animal was cringing at the expectation of every fresh pailful; and when I stood so that he could turn upon me his retracted eye, I shall never forget the expression of that countenance: I do not always like to think of it."

Case Report

Hinds relates one case in which "the whole of a mare's body affected with locked jaw, except the nostrils, was immersed in snow for some time . . . she died on the third day." If the disease follows a foot wound, Youatt does recommend neurotomy; except that this measure would in most cases be too late, the theory is in complete agreement with the fact, little appreciated at that time, that the toxin travels along nerve trunks. In tetanus following operative procedures, as nicking, docking or castration, the wound was cleansed down to fresh tissue, and the cautery applied anew; either of these methods will "cut off the ene-

my's supplies." As even today, cases which most likely resulted from an obscure focus of infection were termed idiopathic tetanus, and were considered more susceptible to treatment than the symptomatic, or traumatic, variety. Another veterinarian writing in the same year states he has cured all his cases of the former, but none of the latter type. In one case following docking, he amputated "almost the entire tail" without results. The resistance of the dog to tetanus was noted by Blaine (Canine Pathology, 1832). In 30 years of the most extensive canine practice in Britain, he records only three cases, all fatal.

Youatt's works on the Horse (1831) and on Cattle (1834) went through many British and American editions, and were revised a number of times following his death. The following is taken from Youatt and Martin on Cattle (N. Y. 1859):

"The treatment (of tetanus) must be the promptest; bleed until the pulse falters, or rather until the patient blows, staggers, and threatens to fall. Twenty, and even twenty-four pounds have been taken, before the desired effect (relaxation) was produced. Advantage must be immediately taken of this to pour in a dose of physic . . . half a drachm of croton meal, or a pound and a half of Epsom salts . . . followed by half a pound of salts every six hours. If four or six doses of medicine have been given, and the animal continues constipated . . . a second bleeding must be resorted to. Purging being established, an attempt must be made to allay the irritability of the nervous system by sedatives . . . give a drachm of crude opium three times a day, continuing the salts. Two, three, or four setons (of black hellebore) in the dewlap have been useful; and benefit has been derived from shaving the back along the whole course of the skin, and cauterizing it severely with the common firing iron.

"If the disease terminates successfully, the beast will be sadly out of condition . . . he must be got into fair plight . . . and then slaughtered; for he will rarely stand work afterwards, or carry much flesh. Should the progress of the disease have been rapid . . . the most prudent thing will be to have recourse to the butcher. The meat will not be in the slightest degree injured."

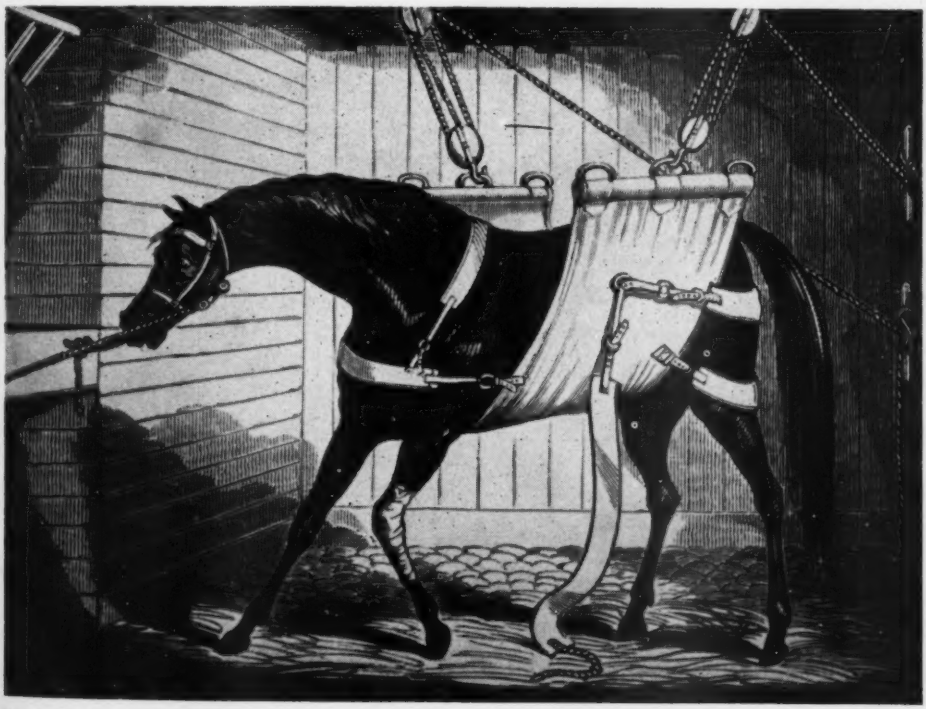

Fig. 4. Method of slinging horse, used for tetanus, fractures, etc. Wm. Percivall: Hippopathology, Vol. I. 1834.

Strenuous Measures

Needless to say, Youatt's strenuous measures found more favor with the majority of those to whom the care of animals had been entrusted than did the less heroic handling of the few who decried these strong measures. The homeopathic veterinary surgeon, William Haycock, in his Principles and Practice of Veterinary Medicine and Surgery (1858), states,

"With regard to medical treatment, we could say much in condemnation of the modes usually pursued. Numbers of horses, we doubt not, die from the disease. Numbers endowed with constitutional vigour sufficient for a time to conquer almost anything, recover in spite of both disease and treatment, whilst others are without doubt destroyed by the treatment pursued.

"The treatment, to be rational, must be directed to three ends. First: To the external comfort of the animal. Second: To the state of the part locally injured; and Third: To control the violence of the disease, by giving all the aid we can to the vital powers."

In modern times tetanus has been known to follow the use of infected ligatures and improperly sterilized instruments. The lack of aseptic technics, together with the increasing use of the ligature by veterinarians in the early 1800's, may have been the reason for some gelders having better success in avoiding the undesirable sequelae of castration, including tetanus, than professional veterinarians. One writer (*Vet.* 1835) in commenting upon the savage use of the cautery, admits,

"The success of common gelders, in my opinion, is founded on this, that however coarsely the operation be done, and however unmerciful may be the application of the hot iron, there is an almost immediate tendency given to suppuration: suppuration does make its appearance much sooner after the iron than after the ligature."

Before the advent of asepsis, this problem must have troubled the minds of many thoughtful veterinarians who would have liked to believe in the plea of the eminent Wm. Percivall (early 19th century) to the effect that, "If we must dock horses, let us not fry the stump like a race of savages."

With tranquillization uppermost in the minds of veterinarians in the treatment of tetanus, it is not surprising that ether and chloroform should be tried after the introduction of these as general anesthetics. What appears to be the first record of etherization in tetanus is reported from the Alfort Veterinary School in *Recueil de Med. Vet.* for October 1847, the year following the demonstration of ether as a surgical anesthetic. As reported in the *Veterinarian* in 1848, a horse in an advanced state of tetanus, the usual treatments being to no avail, was subjected to repeated inhalations and enemas of ether to the point of stupor for several hours at a time. The experiment was suggested by previous successes in tetanus in man; in this case the trial was adjudged a complete success. The editor of the *Veterinarian,* William Percivall, although doubtful over the utility of anesthesia in veterinary surgical practice, suggests in a footnote that this report should induce some veterinarian to try chloroform in tetanus. A few months later this was tried with success (*Vet.* 1849). But like so many other agents which have seemed so promising, the use of anesthetics in tetanus was not continued. Perhaps this too was an instance suggested by a practitioner (*Vet.,* 1835), who in offering a new treatment for tetanus, that of blistering the belly instead of the back, realized that,

"We very often delude ourselves in regard to the operation of medicines, which seldom effect what we suppose them to do. For this reason it is proper that we should be sceptical with regard to new remedies, which hardly ever maintain the character bestowed upon them by their first employers."

Experience undoubtedly relegated this new offering to the same category.

That medical practice relating to tetanus was not appreciably in advance of veterinary medicine may be adduced from the following summary from a leading medical text of the period (Watson's Physic, 1845):

Tetanus arises from wounds or from exposure to cold, although an increased incidence of the disease is noted in hot weather or hot climates. The pathology is obscure; the symptoms result from irritation of the spinal cord or its afferent nerves. The French "have sought to remedy it by enormous blood-lettings; from fourteen to fifteen pounds of blood being taken in the course of a few days by one practitioner; and another bleeding his patient eight times, and applying 792 leeches along the course of the spine, and to the epigastrium." Locked jaw is well known in the nosology of farriers. It is not uncommon after castration.

Heroic Therapy

The treatment of tetanus is a mortifying subject . . . under every plan of management a vast majority die. Opium, blood-letting and warm baths are of little service; cold baths are

somewhat better. Wine is servicable: one patient recovered after consuming 110 bottles, a horse after swallowing "more port wine than he was worth." Drastic purging is of little use—one patient was given in one week: calomel 280 grains, scammony 260 grains, gamboge 110 grains, jalap 3 ounces, infusion of senna 11 pints—"I mention all this to show what the system will bear . . . not as an encouragement to you to prescribe such doses." Other doubtful drugs include: foxglove, tobacco smoke enemas, musk, prussic acid, belladonna, carbonate of iron, oil of turpentine, and strychnine. Curare in doses sufficient to suspend respiration resulted in the cure of a horse at the London Veterinary College—after artificial respiration had been applied four hours—"the experiment deserves to be carefully repeated."

William Sewell, the assistant professor at the London Veterinary College, administered curare in the form of the crude poison upon an arrow point to a horse suffering from a severe attack of tetanus in 1835. In ten minutes apparent death was produced, and the animal was sustained by artificial respiration for four hours, until reanimation occurred, whereupon, "The animal rose up, apparently perfectly recovered, and eagerly partook of corn and hay." The animal died of colic during the night, but without remission of tetanic symptoms. This experiment antedated the first use of curare for tetanus in man by some 20 years. In spite of a number of apparent successes with curare, its use in animals was discontinued until late in the century, when oral administration was found to be relatively ineffective. Recently (Booth and Pierson, 1956) parenteral administration of a pure curare compound (d-tubocurarine) was found to be effective in mitigating the symptoms of tetanus in a horse.

Ether had been used internally in small doses as an antispasmodic in tetanus in America as early as 1818, as reported in James Carver's *Farrier's Magazine*, but the writer states that ether was too expensive to be much used in veterinary practice. Apparently ether was little used until after its popularization as an anesthetic. George Dadd's *American Veterinary Journal* for 1858 reports on the anesthetic use of chloroform in tetanus, and Robert Jennings, in his work on The Horse and his Diseases (1860), says, "Chloroform has been highly recommended, but appears to have only a temporary effect." Jennings used chloroform internally in doses of one to two drachms. The common cause of tetanus he believed to be from wounds, but idiopathic tetanus "is said to be caused in some cases by the action of bots and worms in the intestines." He relies chiefly upon purging, and in preference to opium, "give upon the tongue every hour twenty drops of the following mixture: hydrocyanic acid and tincture of aconite, of each one ounce." While we would assume he meant that the official preparation of hydrocyanic acid (2%) was to be used, it would be of some interest to know how laymen might have interpreted his prescription.

Tranquilization

The widely-distributed Manning's Stock Doctor (1880), in addition to the usual purgatives and antispasmodics, stresses the value of keeping the animal in quiet, darkened, and warm surroundings. Slings are advocated, as is the feeding *via* stomach tube in chronic cases. Because many that do recover are left "in a deplorable condition," it is recommended as a matter of "policy as well as humanity to seriously consider whether it may not be better to relieve the sufferings of the poor animal at once by shooting through the brain."

Dadd, in his Modern Horse Doctor (1854) says, "Very little improvement has taken place in the treatment of tetanus." Instead of the violent measures frequently used, he proposes an end to blood-letting and drastic purging, and discounts the use of chloroform and the recently advocated use of electricity. He places chief reliance upon antispasmodics, laxatives, sedatives, tonics, and attending to the nutritional needs of the animal, by nutritive enemas if necessary. The epithet *idiopathic tetanus*, he believes, obscures the necessity for continued searching for the real cause in those cases not due to wounds. He advances the idea that perverted nutrition may be a cause in these cases. It would seem worthwhile to determine whether certain cases of idiopathic tetanus might arise from an enteric infection as a concomitant of a vitiated state of the intestine.

While some doubts may be entertained concerning the efficacy of Haycock's homeopathic reliance upon small doses of strychnine, and his advocacy of the steam bath, his rational philosophy would appear worth examination, now even as then: he urges,

"If it be not within the power of the practitioner to do good at all times, it certainly ought to be within his power to refrain from the infliction of injury, and by this we mean, to refrain from bleeding, and sweating with sheepskins, the administration of enormous

(Continued on page 470)

Immunization Of Chickens Against Infectious Bronchitis Using An Embryo-Passaged Attenuated Strain Of Virus†

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IT IS well known that recent isolates of infectious bronchitis virus will readily infect chickens and induce a solid immunity. Some strains of bronchitis virus which have been passaged serially in embryos eventually lose their ability to infect chickens and fail to induce an immunity.

The purpose of this investigation was to determine the immune response of chickens to a strain of infectious bronchitis virus which had been passaged serially in embryonating chicken eggs in order to reduce its pathogenicity for chickens.

Materials and Methods

Strain 33, originally isolated at the New York State Veterinary College in Ithaca, New York, in 1944, was used as the immunizing strain at various embryo passage levels through 67 passages. Preliminary intranasal inoculation of this strain of virus after 85 embryo passages failed to produce infection, but an aerosol exposure of the same material did produce symptoms. This strain was also used in the serum neutralization tests after 170 embryo passages.

The serum neutralization (SN) test was accomplished by mixing equal amounts of serum and ten-fold dilutions of allantoic fluid containing bronchitis virus. The mixture without incubation was then inoculated into the allantoic chamber of four embryonating ten or 11-day-old chicken eggs using 0.1 ml. doses. In titration of the virus, normal serum was used in the same manner. The virus usually had a titer of 10^{-6} to 10^{-7} based on inoculation of 0.1 ml. of the mixture of normal serum and virus. Final interpretation of neutralization results was based on mortality, stunting of the embryos or the presence of urates in the mesonephros of the embryos seven days after inoculation.

The second or third embryo passage of infectious bronchitis virus, isolate number 581, was used to challenge the chickens. This strain was isolated from specimens submitted from Georgia by Dr. C. W. Barber in 1950. Serum from chickens which had recovered from an infection with strain 581 had a minimum neutralization index of 1,000 against virus strain 33. The apparatus used to produce an aerosol was a hand-pumped nebulizer (Peralta vaporizer)* or when large flocks were inoculated four nebulizers were connected and a small electric pressure pump or a tank of nitrogen provided pressure to operate the nebulizers. The technic of inoculating the chicks depended upon the size of the groups. Small experimental groups in batteries were inoculated by a handbulb nebulizer. After closing the windows of the room, the material was nebulized toward the chicks in the battery for about five minutes. When large groups of chicks were done in brooder houses, the chicks were crowded into one part of the house and the material nebulized toward the chicks for about five minutes using 8 to 10 lb. of pressure. No attempt was made to estimate either the size of the nebulized particles or the amount of material used per unit of space.

Chickens from three days up to six weeks of age were used in most of the experiments. In a few instances older chickens were used. Immunity to infectious bronchitis virus was determined by either natural exposure or by an experimental aerosol exposure of virulent virus. Some attempts were made to correlate results of serum antibody testing with response to challenge.

Evidence of infectious bronchitis infection following challenge was based on detection of tracheal rales. Starting at 24 or 48 hours after challenge each bird was handled to detect symptoms. Rales could usually be heard in infected chickens by forcing expiration but

†From the Veterinary Medical Research Institute and the Animal Pathology Section of the Agricultural Experiment Station, Iowa State College. The cooperation of Dr. C. D. Lee of the Veterinary Medical Extension Service in inoculating some of the farm flocks, and Miss Francais Weddle's technical assistance are gratefully acknowledged.

*Obtained from Peralta Hospital, Oakland, Calif.

since exercise exaggerated the symptoms it was often desirable to exercise the chicken by holding the bird off balance and allowing it to exercise its wings. This method of handling did not cause rales in normal chickens.

PROCEDURE AND RESULTS

I. Immunization of Chicks with Infectious Bronchitis Virus Strain 33 after 67 Embryo Passages

A. Immunization of Chicks Three to Six Days of age. Group 1. Sixty-five chicks free of passive antibodies were exposed to an aerosol of infected allantoic fluid. Thirty-five chicks of the same age served as controls in a separate isolation room. The inoculated chicks had symptoms in 24 hours. Symptoms continued for one week. Forty-eight hours after aerosol exposure six susceptible chicks were placed in the room with the inoculated chicks to obtain information on the spread of infection. These chicks were placed in an open top metal basket above the battery in which the infected chicks were kept, but no symptoms developed.

Fifteen inoculated, eight controls and the six room controls were given an aerosol exposure of the challenge strain of bronchitis virus three weeks after inoculation. All the controls including the six room controls came down with symptoms while only one inoculated bird failed to resist the challenge. The remaining birds were challenged by natural exposure and all the inoculated birds resisted the infection while all the controls developed symptoms.

Group 2. A series of large groups of broiler chicks were infected with strain 33 after 67 embryo passages in an effort to control an outbreak of infectious bronchitis in a broiler plant. Losses from the disease had been from 15 to 22% depending on the age of the chicks. Since a separate starting room could be used to brood the chicks, it was planned to inoculate each brood at four to five days of age using aerosol exposure, allowing them ten days to recover and then moving them into growing batteries in another room. The starting room was then cleaned and fumigated for the next group of chicks.

Following aerosol exposure, respiratory symptoms appeared in 24 hours and continued for about ten days with negligible mortality. It was observed that if the chicks were permitted about ten days from the time of inoculation to recover they could withstand an exposure to the field strain. However, as happened in two instances, the field strain apparently got into the starting room and caused mortality of the chicks which had been inoculated with the immunizing strain. After eight groups had been inoculated in this plant, infectious bronchitis subsided. It had been the experience of this operator that previous outbreaks could not be stopped without closing down operations entirely.

Group 3. Fifty broiler chicks free of passive antibodies as determined by the SN test were infected by aerosol exposure to strain 33 after 67 passages. Typical symptoms followed. At 72 hours 50 chicks of the same hatch were mixed with the inoculated chicks. In a separate but adjacent brooder house 50 chicks were raised as controls and cared for by the same caretaker. Two weeks after inoculation 25 White Leghorn chicks five days of age were mixed with the inoculated and contact control chicks.

Six weeks after inoculation five birds from each of the groups were challenged by natural exposure. All birds were also bled prior to challenge for serum antibody testing. Table 1 gives the results of challenge and serum testing.

At 12 weeks after inoculation challenge by natural exposure of a similar number from each group revealed all controls susceptible and only one of five inoculated birds resistant. Reinoculation by aerosol of the remaining birds in the groups except the isolated controls and challenge six weeks later resulted in 82% of the birds resisting an aerosol challenge.

TABLE 1. Results of Serum Testing and Challenge of Group 3 Chickens

Group and Bird No.	Log. neutralizing index SN test	Symptoms after challenge
Controls		
181	0.6	+6*
437	not done	+6
182	1.0	+8
450	0.6	+7
196	not done	+6
72 hr. contact controls		
97	4.0	neg.
93	3.7	neg.
87	5.0	+3
98	5.3	neg.
95 (died at bleeding)		
2 week contact controls		
499	(4.7)	+7
498	(pool)	+6
500	not done	+4
721	not done	+2
489	5.3	neg.
Inoculated birds		
472	5.7	+4
469	3.6	+5
470	5.7	+3
471	3.0	neg.
468	5.3	neg.

*+6 means symptoms were detected for 6 days.

B. Immunization of Chicks Three to Five Weeks of Age. Group 4. At three weeks of age, 200 chicks were exposed to an aerosol of strain 33 after 67 embryo passages. Symptoms were observed at 24 hours, and at 48 hours 200 chicks of the same hatch were mixed with the inoculated chicks. Symptoms developed in some of the contact controls. At ten weeks nine inoculated and nine contact controls were challenged by natural exposure of 581 bronchitis virus. Of the inoculated birds seven of the nine resisted challenge while only two of the eight contact controls resisted challenge. Serum samples from both inoculated and contact control birds were tested for antibodies and all serums had a 10^4 or more neutralizing index against the homologous virus (strain 33). At seven months, eight inoculated and eight controls were challenged by an aerosol exposure of strain 581 virus. This time only one of the eight inoculated and two of the eight contact control birds resisted the challenge. Serum samples were not tested for antibodies.

Group 5. Approximately 500 chicks three weeks of age in a farm flock were exposed to an aerosol of strain 33 bronchitis virus after 67 embryo passages. The same number in an adjacent brooder house were kept as uninoculated controls. Both groups had the same caretaker. Symptoms of bronchitis were observed in the inoculated group but not in the control group. No unusual mortality was experienced.

Eleven weeks after inoculation ten inoculates and six uninoculated controls were challenged by natural exposure to strain 581 virus. Serum samples from the birds were tested for antibodies against strain 33 virus. Table 2 gives the results. Five of the ten inoculated birds and all the controls developed symptoms after challenge.

Group 6. Another farm flock was exposed to an aerosol of strain 33 virus after 67 embryo passages. The chicks inoculated ranged in age from three to six weeks. The controls again were held in a separate house adjacent to an inoculated house using the same caretaker for both groups. Respiratory symptoms were observed in the inoculated group but not in the controls. Eleven weeks after inoculation eight inoculated birds and five control chickens were challenged by natural exposure. Table 3 gives the results of serum testing and challenge. Three of the inoculated and all the control chickens developed symptoms after challenge.

Group 7. Chicks in a farm flock two to four weeks of age, were exposed to an aerosol of strain 33 virus after 67 embryo passages. Controls were kept in a separate but adjacent house and one caretaker was used for all the chicks. Challenge was by natural exposure to strain 581 bronchitis virus ten weeks after inoculation. Table four gives the results of serum testing and challenge. Three of six inoculated and all the controls developed symptoms after challenge.

TABLE 2. Results of Serum Testing and Challenge of Group 5 Chickens

Inoculated bird no.	Log neutralizing index SN test	Symptoms after challenge
65	3.5	+4*
66	5.2	neg.
67	3.2	+3
68	3.2	neg.
69	5.2	neg.
70	2.9	neg.
71	3.5	+4
72	2.0	+2
74	2.7	+4
75	3.9	neg.

*+4 means symptoms were detected for 4 days.

C. Immunization of Chickens 14 Weeks of Age. Group 8. Eighty-eight White Leghorn pullets 14 weeks of age were inoculated by aerosol with strain 33 of bronchitis virus after 67 embryo passages. At 48 hours after inoculation 78 pullets of the same age were introduced as contact controls. All the chickens were handled every other day for two weeks to detect

Fig. 1. Apparatus employed when large groups of chicks were inoculated by aerosol. Four nebulizers were connected as illustrated to a small electric pressure pump. In other instances a tank of nitrogen provided the necessary pressure for operation.

TABLE 3. Results of Serum Testing and Challenge of Group 6 Chickens

Inoculated bird no.	Log. neutralizing index SN test	Symptoms after challenge
190	3.2	neg.
72	2.7	neg.
59	3.7	neg.
130	2.5	+3*
288	2.9	+7
20	4.7	neg.
235	2.7	+5
303	not done	neg.

*Symptoms observed for 3 days.

rales. Symptoms were detected in 85 of the 88 inoculated birds, while symptoms were detected in 27 of the 78 contact controls.

Six weeks after the date of inoculation all the birds were challenged by an aerosol exposure of bronchitis virus strain 581. The chickens were handled on the third, fifth and seventh days after challenge. Symptoms were detected in 12 of the 88 inoculated birds (13.6%) while of the contact controls symptoms were noted in 46 of the 78 chickens (59%).

In this experiment as in groups 3 and 4 the virus did spread to contact controls, but apparently the infection resulting from the contact exposure did not induce as good an immunity as was induced by the aerosol exposure.

TABLE 4. Results of Serum Testing and Challenge of Group 7 Chickens

Inoculated bird no.	Log. neutralizing index SN test	Symptoms after challenge
90	2.0	+5
91	1.4	+5
92	4.2	neg.
93	4.7	neg.
94	4.2	neg.
95	3.0	+2

II. Immunization of Chicks with Strain 33 Bronchitis Virus After 53 Embryo Passages

Group 9. Twenty-four White Leghorn chickens three weeks of age were inoculated with an aerosol in an isolated room. On the third day after inoculation 12 chickens were introduced as controls into the same isolation room but in an adjacent battery. The inoculated group developed symptoms by the second day and continued for about one week; however, no symptoms developed in the controls.

Five weeks after inoculation three controls and six inoculates were challenged by an aerosol exposure to strain 581. The controls developed symptoms which continued for eight days while one of the six inoculates had symptoms for two days.

Three months after inoculation the remaining birds (eight controls and 16 inoculates) were challenged by natural exposure. All controls and three of the 16 inoculates developed symptoms. No serum antibody testing was done in this group.

III. Immunization with Strain 33 After 42 Embryo Passages

Group 10. Forty White Leghorn pullets two months of age were exposed to an aerosol of strain 33 after 42 passages. Twenty-five pullets of the same age served as controls in a house 50 feet away. Respiratory symptoms developed in the inoculated birds. Ten weeks following inoculation eight inoculates and five controls were removed for challenge to an aerosol of strain 581. All controls and one of the eight inoculates developed symptoms.

At 14 weeks after inoculation eight inoculates and five controls were removed for challenge using an aerosol of bronchitis virus strain 581. All controls and none of the inoculates developed symptoms. Seven months after inoculation eight inoculates and five controls were removed for challenge using an aerosol exposure. All controls and three of the eight inoculates developed symptoms.

Nine months after inoculation a similar number were challenged by aerosol. All the controls and three of the eight inoculates developed symptoms.

Ten months after inoculation the remaining birds were challenged by natural exposure. The four controls developed symptoms while the six inoculates resisted the challenge. Serum samples from these six inoculated chickens had at least a 10^8 neutralizing index.

Discussion

In preliminary immunization experiments it was observed that an aerosol exposure of high-passage bronchitis virus induced respiratory symptoms in chicks which resulted in some immunity, while an intranasal inoculation of the same material failed to induce detectable symptoms and no appreciable immunity. This led to the use of the aerosol exposure technic in this series of experiments initiated in the winter of 1952-1953 to determine the effectiveness of high-passage embryo material in the immunization of chicks against bronchitis.

It has been difficult to set up well controlled immunization experiments with live infectious

bronchitis virus. This has been particularly true with long-term experiments, since frequently these trials end with the controls developing infection. The experiments described in this report are short-term experiments with the exception of groups 4 and 10 which continued uninterrupted for seven and ten months respectively. Groups 5, 6 and 7 were initiated as long-term experiments, but when the birds were brought to the laboratory for testing at approximately five months it was found that the controls had become resistant and that also the inoculated group had developed an increased resistance indicating possibly that a field strain of virus had become active in the flock.

While the field studies with this strain of virus were successful during the 1953 season in that no outbreaks occurred in the flocks observed during the laying year, it can not be said that the immunization strain was solely responsible. In fact, the results of the experiments described using strain 33 after 67 embryo passages would suggest a decreasing resistance with time, and that a flock would become partially susceptible to a field exposure.

The spreading ability after 67 embryo passages of strain 33 of bronchitis virus is low since controls kept in close proximity to the inoculated groups would usually remain susceptible. Even after 53 passages the virus had no ability to spread in experiment 9 to controls when introduced in the same room during the height of infection in the inoculated birds.

While low spreading ability of an immunization strain is highly desirable it must at the same time have the ability to induce a lasting immunity. Strain 33 after 67 embryo passages did not have the ability to induce as good an immunity as was desired. However, after 53 embryo passages the strain of virus induced a better immunity and after 42 embryo passages the virus produced a satisfactory lasting immunity. After 42 embryo passages the virus did have greater ability to spread since it was found that controls could not be introduced into the same room as was done in experiment 9 without having the controls develop the disease.

In testing for the resistance against bronchitis virus, challenge was preferred over serum antibody testing although it is desirable to have the results of both tests. The finding of a neutralization index of 100 or even 1,000 against the homologous strain (33) did not mean that the bird would be immune to the 581 challenge virus. As a rule birds having greater than a 10^4 neutralizing index were immune while those having less than a 10^3 index were susceptible. The rather poor correlation between serum antibody testing and challenge in these experiments indicates the necessity of further study of possible antigenic difference between strains.

The difference between aerosol challenge and natural exposure challenge was not compared critically. Natural exposure was done by inoculating susceptible birds by aerosol at least 48 hours before introducing the birds to be challenged. The inoculated birds were then placed in direct contact with the birds to be challenged usually at the rate of one infected to five or six birds to be challenged. Following aerosol challenge many birds will have symptoms at 24 hours and usually all that are going to develop symptoms will do so by 48 hours. Following natural exposure a few controls might have symptoms in 24 hours, but the majority of birds with symptoms may not be found until 72 hours. The number of days the challenged birds had symptoms was regarded as some indication of the degree of immunity. In a number of challenge trials not reported in this series it was frequently noted that susceptible controls would continue having symptoms of rales for two or three days longer than the partially immune inoculated birds. Birds having symptoms for only two and three days were considered to be more immune than birds having symptoms for five to seven days.

Summary

Groups of chickens of varying ages were exposed by aerosol to strain 33 infectious bronchitis virus after 67, 53, and 42 embryo passages to determine the ability of the virus to induce an immunity. Using resistance to challenge as the criterion of immunity it was observed that the virus after 67 embryo passages had low spreading ability, but it did not produce a lasting immunity. After 53 embryo passages the virus produced a better immunity than did the virus after 67 passages. Chickens exposed to virus which had been passaged 42 times in embryonating chicken eggs had a satisfactory immunity for at least ten months.

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Blackstrap molasses appears to be excellent as a carrier for finely ground, water insoluble phenothiazine powder.

Effects of Nervousness on Conception During Artificial Insemination

W. D. POUNDEN,* D.V.M., Ph.D., and J. G. FIREBAUGH**

Rapid transport of sperm in the reproductive tract of the cow involves uterine motility which is under the influence of oxytocin-like hormone, the release of which is associated with stimulation of the reproductive tract[1,2]. The possibility has been suggested that the hormone, epinephrine, which is antagonistic to oxytocin-like effects might be released at the time of breeding because of fright[3].

Should fright and nervousness be sufficient to affect the hormone status, it would seem quite likely that conception also would be affected. The purpose of the present study was to obtain information as to whether variations in the intensity of the nervousness, within the range usually encountered in artificial insemination of cows and heifers, had any effect on conception rates.

Experimental

Each animal, at the time of service, was rated by the technician according to the degree of nervousness manifested. A single technician made all the ratings so that individual variation from this source was kept to a minimum.

The ratings used were as follows:

Completely quiet—0

Slightly nervous—1

Nervous, moved around—2. Jumped and moved around to a greater degree than 2—3.

An additional rating was given for extreme nervousness and fright but it was assigned on so few occasions that the data have been omitted.

A total of 2,009 services involving 1,445 animals were rated.

The first measure was based on the reasoning that should nervousness, fright, and anxiety, adversely influence the chances of conception then the number of repeat services recorded under the higher nervousness ratings should be greater than under the lower ones.

Consequently, for each nervousness rating the percent of first services and repeat services up to the fifth were calculated.. Nervousness rating 2 had in it the highest percent of first services followed by rating 1, then rating 0, and lastly rating 3 (table 1). The figures were 67.7, 64.9, 63.2, and 59.6% respectively The differences, to a great extent, were balanced by those noted between the percentages of second services which were 21.6, 26.5, 27.5, and 31.9% listed in the same order.

TABLE 1. Influence of the Intensity of Nervousness Displayed by Dairy Cattle During Artificial Insemination on the Proportion of First and Each Repeat Service Up to the Fifth One per Animal

Nervousness Rating	Total Inseminations	Percent of each number of services per animal				
		1st	2nd	3rd	4th	5th
0	204	63.2	27.4	7.4	1.0	1.0
1	1036	64.9	26.5	6.5	1.9	0.2
2	722	67.7	21.9	7.5	1.8	1.1
3	47	59.6	31.9	2.1	4.3	2.1

Whereas the first measure concerned the ratings given services, a second measure used was based on ratings of individual animals. This second measure was a comparison of the number of conceptions at first service for each nervousness rating. For the purposes of this study 60-days non-return was used as the measure of conception.

In applying this measure, the nervousness ratings which had been given each cow for her breedings were averaged in order to provide a single rating for each animal. This assignment of single ratings was done easily when only a single breeding was recorded or where the same ratings had been given at all breedings or a simple average was possible. This was impossible in some instances so an arbitrary method was used. When two breedings were involved and the rating numbers were consecutive ones, the highest rating was taken. Where there were other ratings that could not be averaged in whole numbers, the nearest whole number was assigned.

The summarized figures (table 2) illustrate that the best conception, 72.4%, resulted where the animals involved were those which had been given an average nervousness rating

TABLE 2. Influence of the Intensity of Nervousness Displayed by Dairy Cattle During Artificial Insemination on the Percent of 60-Days Non-Return for First Services

Nervousness Rating	Number of Cows	Non-Returns (60 days)	Returns non-Percent
0	134	84	62.7
1	767	555	72.4
2	501	332	66.3
3	43	26	60.5
Total	1445	997	69.0

*Ohio Agricultural Experiment Station, Wooster, Ohio.
**Northern Ohio Breeders Association, Tiffin, Ohio.

of 1. The second best conception rate was 66.3% being for the animals having nervousness ratings of 2, followed by those under ratings 0 and rating 3 with 62.7% and 60.5% respectively. Statistical analysis by means of chi-square showed that the probability of these results being obtained by chance was less than 2%.

Thus both smaller percentages of first services were observed in the first measure and lower conception rates for first services were obtained in the second measure for nervousness ratings 0 and 3 as compared to ratings 1 and 2. This would indicate that unusually placid reactions or considerable nervousness on the part of animals at time of artificial insemination may be less desirable than the more usually observed responses. However, the numbers represented in the groups having the ratings of 0 and 3 were small and consequently conclusions must be limited.

Summary

Dairy cattle were rated at time of artificial insemination on the extent of the nervousness displayed. A total of 2,009 services involving 1,445 animals were rated using four classifications. The effect on conception was evaluated by use of two measures (1) based on services, by noting for each nervousness rating the percent of first services and repeat services up to the fifth and, (2) based on individual animal results by checking the number of conceptions at first service under each nervousness rating. The numbers involved were small and so conclusions must be limited, however, the results indicated that considerable nervousness or unusually placid reactions at time of service may be less desirable than the more usually observed responses.

The authors wish to acknowledge the assistance of Miss Beverly Truex in the compilation of the data.

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Packers discriminate against loads of cattle part of which are horned.

Large Animal Surgery

(Continued from page 456)

Perform with accuracy and speed. Plan carefully with full understanding and retain at all time an alert mental equilibrium.

Clean wound of exudates, clots, debris, and traumatized tissue. Avoid possible fat necrosis. Use copious amounts of normal saline for flushing and avoid excessive sponging.

Close wounds properly and obliterate all pockets for accumulation of serum.

Approximate the edges of the wound. It is discouraging to see a surgeon perform a good piece of work and then fail to finish with good suturing. Consider effects of buried and tension sutures.

Use antibiotics if wound is contaminated by infectious material.

Do not neglect postoperative care.

Prescribe a light diet for postoperative recovery period and one that is nutritious.

Administer a mild laxative when indicated; or enemata.

Apply moist heat over incision.

Prescribe exercise.

Provide protection from other animals of the herd.

Administer parenteral fluid, *i.e.*, blood, normal saline, electrolyte solutions, dextrose solutions.

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History of Some Current Problems in Animal Disease: Tetanus

(Continued from page 463)

doses of drastic purgatives, and when the opportunity offers, the indiscriminate forcing into the system of drug after drug, without regard either to its suitability to the case, or the injurious effects which it may produce. Medicine, unless given under the enlightened guidance of a law, is a dangerous game of hazard. In no other disease will the Veterinary Surgeon find a greater necessity to carry out the Hunterian rule than in Tetanus: viz, to allay morbid irritation, and give support to the vital energies."

▼ ▼ ▼

If a cow has become pregnant as a result of service by an undesired sire, the veterinarian is frequently called upon to handle the condition to produce early abortion. Most practitioners report good results, with a minimum of undesirable sequelae, following the expression of the corpus luteum, and thereafter administration of diethylstilbestrol.

Advances Made In Swine Practice

H. C. SMITH,* D.V.M., Sioux City, Iowa

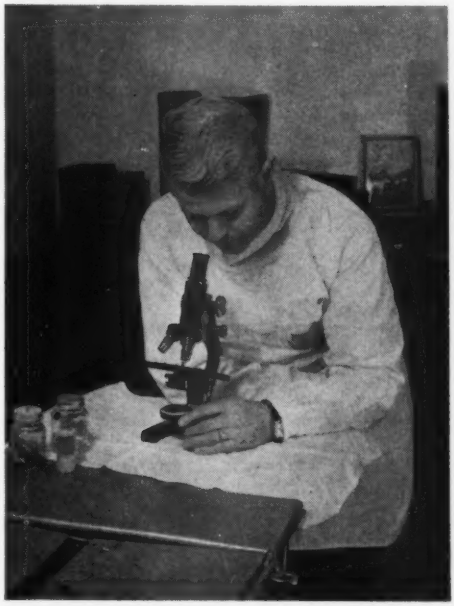
Part X: Chronicle of Progress

ONE of the purposes of this series, concluded with this part, has been to point out difficulties that beset pioneer veterinarians who were engaged in swine practice and research during the early developmental period of the swine industry.

Any attempt to evaluate their work must proceed in terms of disease concepts then accepted. It is not intended here to disparage these efforts. In fact, we wonder how they accomplished so much with so little. Grave uncertainties attended studies on swine diseases because of improper equipment and inadequate laboratory facilities. The many arguments presented at veterinary meetings (and there were many) were generally intended for the best interest of swine producers. There possibly was essential truth in the rather generally held opinion that swine were susceptible to only one primary disease (cholera). A great outbreak occurred in 1887, another in 1897, which was followed by a lengthy period of quiescence until the devastating outbreak of 1913. It took some years to convince some of our colleagues that swine suffer from other diseases. It is quite natural that during the period that hog cholera has been recognized, concepts concerning it have changed as material for study has increased, and as new fact was added to newly revealed fact. No doubt some presently acceptable conclusions relating to this disease will be subject to amendment in the future.

Early Concept of Swine Disease

In 1900, few American veterinarians expected the profession ever to be concerned with the care and treatment of food producing animals. Medical care of dogs and cats was looked upon as an insanitary practice. The automobile had not been invented, and could hardly be expected to replace the horse as a means of transportation; nor was the tractor then challenging horse power on the farm. There was only one primary disease of swine, namely hog cholera, and at that time the only



Dr. H. C. Smith

control measures followed were cremation of carcasses of dead pigs, premise quarantines, and restrictions on movements of swine in the area. Other diseases of swine were recognized and documented as occurring in Europe but these were considered to be limited to the Old World and classified as exotic foreign diseases. Following discovery of the cause of hog cholera and a means of prevention, American veterinarians were urged to obtain information about the disease and to take an active part in its prevention. Some were willing. Others hesitated.

Among early workers were Law, Detmers, Salmon, Theobald Smith, Osler, Billings, Welsh, DeSchweinitz, Dorset, Balton, and McBryde. The work and writings of these men were responsible in large measure for the education of American veterinarians and their participation in the practice of swine diseases.

Articles pertaining to swine anomalies in general were written by Hutyra and Marek, Mohler and Eichhorn, C. J. Marshall, N. S.

*Allied Laboratories, Inc.

Mayo, A. T. Kinsley, E. A. Cahill, L. A. Merillet, D. M. Campbell, R. R. Dykstra, C. H. Stange, H. P. Hoskins, Charles Murray, J. V. Lacroix, A. H. Quin, W. A. Hagen and many others. All of this information has aided practitioners to take measures to minimize losses incident to these diseases. It is fitting that we pay our respects to those early leaders who were responsible for the organization of the discipline of veterinary medicine to cope with present and potential diseases to which swine are susceptible.

Review of literature during the preparation of articles previously published dealing with events related to various infectious diseases of swine indicated a contrast with modern technics for dissemination of information. Reliable textbooks on most veterinary subjects were limited in number and those dealing with swine disease were rare. Early writers were men of vision, understanding, and honesty. If it were not for these attributes, the profession would not have advanced as rapidly as it has in the past 50 years. Early publications carrying articles on swine diseases included: *The Experiment Station Record, American Veterinary Review, The American Journal of Veterinary Medicine* (now VETERINARY MEDICINE.) Later, the *Journal of the American Veterinary Medical Association, North American Veterinarian,* and the *American Journal of Veterinary Research* were developed to fill the almost unsatiable demand for information. Information gained through publication of trade journals by commercial biological houses has had a tremendous influence in the promotion of progress in our knowledge of swine diseases. Without the influence of all of these, it would have been impossible to have reached the present state of general understanding.

Services of commerical laboratories range from those offered by strategically located sales offices to well equipped diagnostic laboratories having extensive research facilities. Many of these are now staffed by specially trained, experienced personnel to meet the demand for increasingly specialized services to swine practitioners. It seems almost paradoxical that despite great progress made in the last 50 years, disease processes continue to challenge the best trained and alert practitioner and scientist.

The most confusing problems in swine practice arise as a result of septicemic diseases. It is not possible to make a positive diagnosis in the field. Most veterinarians, therefore, rely a great deal on the laboratory for assistance in the isolation of bacterial pathogens. Nor is it possible, at the present time, to cultivate all the viruses that affect swine. In a cholera susceptible drove, it is always advisable to administer hog cholera antiserum when illness appears in which septicemic lesions are found. Few veterinarians today see field cases of uncomplicated hog cholera. Development of purebreds, inbreds, and hybrids have confused certain medical aspects, as has the development of husbandry practices, including feeding. These matters influence, change or prevent usual manifestations of pathological processes that plague the swine industry.

Progress Resulting from Study and Application

During 1910-1913, few veterinarians were qualified to do vaccination work or to recommend practical measures of disease control. At that time, few had studied pathology of swine diseases because it had not been important. Practice was often limited to horses. Articles published in current literature were virtually all that was available to many who were called upon to handle disease problems in swine.

During 1918[1] the swine industry was plagued with postvaccination complications referred to as enteritis, necrobacillosis, hemorrhagic septicemia, tuberculosis, and mixed infections. Immunizing dosage of cholera virus was under discussion at meetings. Some practitioners felt that 0.25 to 0.5 cc. was sufficient, while others contended that the dose of 2 cc. was not enough. Many refused to believe that other diseases were concurrent infections. Houck[2] estimated that 90% of the swine losses on farms was due to hog cholera. In that year (1918), 2,500,000 hogs died of the disease in the United States. Farmers had been advised for ten years to have their herds immunized, yet few followed the recommendation. Impotent and contaminated serum and virus which were placed on the market prior to the passage of the Virus-Serum-Toxin Act (1913), together with faculty technic in administration, plus inability of many practitioners to differentiate hog cholera from other swine diseases, accounted for the lack of interest and confidence on the part of the farmers.

Walter E. King[3] emphasized the importance of organisms of the colon-typhoid group, Pasteurella group and Spirochaeta. Lesions present in enteric fever were not recognized in the field generally. Earlier, most changes associated with these bacterial infections were

thought to be due to hog cholera. What was needed was a clearer definition of cause of septicemic lesions other than those due to cholera.

Swine Diseases Differentiated

Kinsley *et al.*[4] presented a list of abnormal conditions in swine, using terms that indicated the cause of disease. These authors suggested hog cholera, hemorrhagic septicemia, abortion, pig scour of dysentery, tuberculosis, actinomycosis, anthrax, malignant edema, infectious rhinitis (bull nose), and infectious necrotic enteritis as separate disease entities. They stated that hemorrhagic septicemia was a primary disease of swine; abortion a specific disease. Scours of suckling pigs was recognized clinically. Tuberculosis, actinomycosis, anthrax, and malignant edema were also specific unrelated disease. They felt that *B. pyocyaneus* was the cause of infectious rhinitis. Salmonellosis was proposed for the disease caused by *B. suipestifer*. A condition of baby pigs called "thumps" was probably a manifestation of anemia. A form of dermatitis called "measles," which consisted of papular eruptions, was no doubt swine pox. The causative agent of swine influenza had not been found so this condition was called "flu." Specific treatment recommendation for these entities had to await clinical study after classification.

In the study of enteric fever of swine, Dimock[5] expressed the opinion that *B. coli communis* was found in the body tissues outside of the intestinal tract and ventured that some abnormal condition existed which facilitated or made possible its migration into tissues. There was always the possibility that the natural barriers were lowered to a point sufficient to enable the organism to gain entrance to the blood and deeper body tissues. Some believed that this organism might be responsible for enteric conditions which followed hog cholera vaccination.

Because of less than thorough training and understanding in this field, practitioners failed to impress growers of their qualifications to handled disease problems of farm livestock other than horses. This idea was destined to change for reason that those trained in the basic physiological sciences were beginning to apply themselves to the livestockmen's problems[6]. Experiment stations were begining to offer their facilities for special research on swine diseases.

According to Robert Jay[7], hemorrhagic septicemia had been recognized as a specific

Uniform, boots, and gloves complete the author's attire for field autopsy. Owners are usually interested observers.

disease since 1886, but it was not until 1918 that it became well established as a pathogen in swine. The bipolar organism was isolated from the lungs of normal pigs and hog cholera infected pigs. At that time (1918) pulmonary symptoms were associated with swine plague, particularly in herds in which only a few pigs became sick. In some cases, recovery of ill hogs was taken to confirm pasteurella infection because hog cholera was considered always fatal. Mortality rate of swine plague approximated 5%. Tail bleeding of affected pigs at the rate of 5 cc. for each lb. of body weight was the recommended treatment for swine plague.

Research Efforts Rewarding

A force of 52 federal veterinarians was maintained during the year 1921 for hog cholera control work in 31 states[8]. There were a few cases in which, for some unexplainable reason, vaccination failed. Some farmers criticized charges made by practitioners for the simultaneous treatment. Warnings were sounded that unless action was taken to correct the unfortunate situation brought about by a few unscrupulous individuals, growers would assume vaccination tasks. Hog cholera "cures" and fake remedies came into existence.

In 1921[8] hog cholera, swine flu, and infectious enteritis were referred to as the important

Atrophic rhinitis. Complete slough of turbinates with occlusion of air passages (l.). Beginning slough of median septum (ventral), otherwise grossly normal (r.).

diseases of swine. A term "mixed infection" was being used to describe complicating pathological conditions. Hemorrhagic septicemia was also described. Specific and nonspecific bacterins were employed[9]. Some of the most influential farm papers in the country were warning their readers against the veterinarian who diagnosed strange diseases and administered new remedies while the hogs died of cholera. If a herd of swine sickened, they advised that cholera serum be given first.

L. Van Es[10] called attention to the fact that the soil could not be disinfected. Manure and debris must be removed from hog houses and yards where young pigs were to be raised, a substantial recommendation for sanitation and hygienic husbandry. Hog wallows were condemned. The term sanitation meant the creation and maintenance of an environment which was safe to animal life. Many of the filth diseases of pigs could be controlled by the elimination of contaminated lots, adequate drainage, cropping of areas and withholding of swine. In connection with hog lot sanitation, attention was directed to the manner in which food and water were offered. Sanitary care of watering and feeding equipment were recommended practices from a disease control standpoint. Criticized was use of disinfectants having a strong odor, in lieu of cleaning, which was proving popular with growers.

Strange[11] reported that because of the widespread dissemination of hog cholera, public apathy towards strict control measures, and lack of knowledge regarding the mode of transmission made it practically impossible to control the disease. When the serum treatment was discovered, it was hailed as the salvation of pork production in the United States. Since no restrictions were placed on the distribution of virus, control of the disease would be impossible. Rate of loss in this country attributed to this single viral disease was 48.4 per 1,000 animals for the period 1907-11. Losses from 1917 to 1921 were placed at 46.5 per 1,000. These figures, not widely divergent, compared morbidity experience prior to and immediately after the availability of specific antiserum. Conclusions reached were that simultaneous immunization of swine was not being employed for realization of potential value.

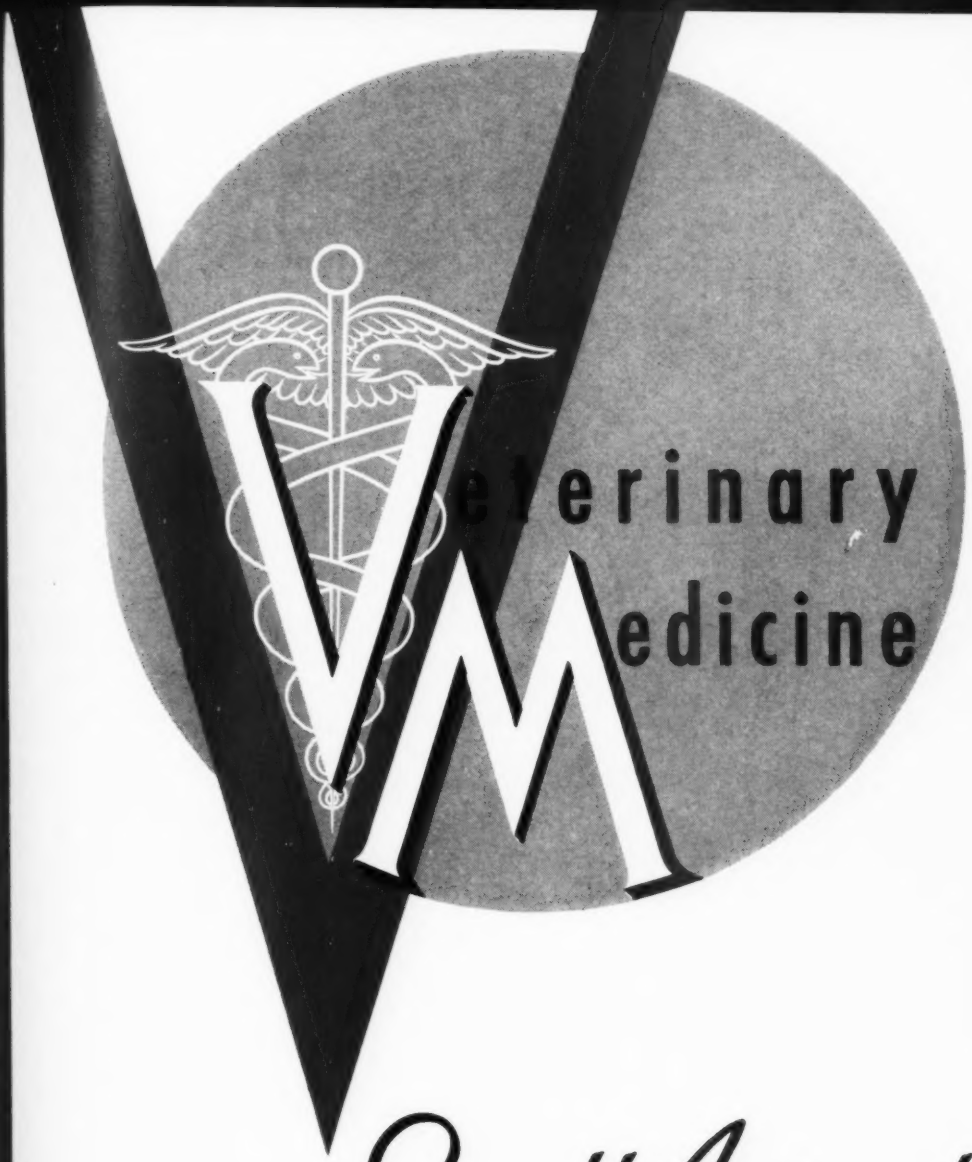
The Swine Breeders Association recommended more uniform laws and regulations regarding the movement of swine within the states and between the states[12]. Producers of purebred swine were confused by state regulations governing the movement of breeding stock. They requested then and have sought since uniform laws and regulations that were realistic. Some progress has been made in this respect.

Question Potency of Antiserum

Cahill[13] stated that farmers and some times veterinarians were apt to blame impotent serum for postvaccination troubles. Entirely too many herds of swine were revaccinated just to satisfy the swine owner when, in fact, the swine were ill from some disease other than hog cholera. Many practitioners believed that petechia on the kidneys were diagnostic of cholera. Blood was procured from pigs in 31 cases in which sickness appeared in from four to 30 days subsequent to vaccination. When the blood was injected in susceptible pigs, it demonstrated the absence of cholera virus in 74.1% of cases tested. Favorable results following additional antiserum treatment was likely due to the protein stimulation or to the antibodies content for other pathogens.

A severe and widespread epizootic of hog cholera appeared in 1926[14]. Its spread was

(Continued on page 491)



Small Animal

SECTION

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Treatment of Poisonous Snakebite In The Dog With Cortisone Acetate

WILLIAM A. KNAPP, JR.,* D.V.M., and HERSCHEL H. FLOWERS,** D.V.M., Athens, Georgia

THE treatment of poisonous snakebite in the dog is still a controversial subject. Today, as 25 years ago, many remedies are used, some of which may be more harmful to the patient than helpful. It is generally agreed, however, that no one treatment or drug is of sufficient therapeutic value to prevent mortality from poisonous snakebite — provided the animal received a lethal dose of venom. A combination of both specific and symptomatic therapy is of utmost importance[1].

Each year veterinarians are presented with dogs which have received bites from snakes. Many of these were either bitten by nonpoisonous snakes or received sublethal doses of venom from poisonous snakes. In either case, the animal will recover regardless of the medication administered. These clinical cases promote false confidence in the drugs and therapeutic methods employed.

Four types of poisonous snakes are found in the southeastern United States: The rattlesnake, copperhead, cottonmouth, and the coral snake which carries the most toxic venom of the four. However, due to the small size and less aggressive disposition of the coral snake, it is of less significance than the others listed. Only the pit vipers (rattlesnake, copperhead and cottonmouth) will be discussed.

The largest and the most dangerous is the rattlesnake. There are 26 known species of rattlesnake in the United States, five of which are found in the southeast. The most poisonous of these is the eastern diamondback *(Crotalus adamanteus)*. Because of its superior size, venom capacity, and aggressiveness this snake is also considered by most authorities to be one of the most dangerous snakes in the world[2, 3]. The bite of the cottonmouth and copperhead cannot, however, be minimized by the veterinary clinician. It should be emphasized that the amount of venom injected and the size and species of the snake must receive the utmost consideration in formulating methods of treatment and adequate prognoses. Venom capacity and fang size vary in direct proportion to the physical size of the snake.

Pathology

The pathology produced by the venom of pit vipers varies little among the species. While the chemical structure of snake venoms has not been fully established, the toxic effects have been attributed to the presence of proteolytic enzymes, phosphatidases, and neurotoxins[4]. Lymph and serum collect at the site of injection and as the venom is mixed with these fluids, it slowly diffuses throughout the surrounding area, causing much tissue destruction and hemolysis. The diluted venom at the outer edge of the affected area is absorbed rather slowly into the lymphatic system and is carried into the systemic circulation. Jackson[5] has found that after seven hours some of the

*Dr. William A. Knapp is assistant professor of physiology and pharmacology, School of Veterinary Medicine, University of Georgia.
**Dr. Herschel H. Flowers was a senior student, School of Veterinary Medicine, University of Georgia, at the time the experiment was conducted.

New York Zoological Society Photo

Eastern or Northern Copperhead (Agkistrodon m. mokasen).

venom can still be recovered from the site of injection. Once the venom reaches the systemic circulation characteristic clinical signs of weakness, impaired vision, nausea, cyanosis, decreased red blood cell count, paralysis, edema, shock, and possibly death may be observed[5, 6, 7]. Any or all of these may be evident in one patient.

Necropsy

Postmortem examination will reveal evidence of tissue destruction. The skin in the area of the bite may have sloughed away. The immediate underlying musculature, vessels, nerves, et cetera will be plainly visible. The musculature is usually dark red, or nearly black, and edematous. Necrosis of the lymph nodes which drain the area of the bite, enlargement and congestion of the spleen, petechiae and ecchymoses of the intestinal wall, kidney, and mesentery usually are observed in animals that have succumbed from the toxic effects of snake venom. Hyperemia of the duodenum is also a common finding[6].

Objective

During the past ten months experimental work has been in progress to determine the therapeutic value of cortisone acetate (cortone acetate[@1]), in the treatment of poisonous snakebite in the dog.

Materials and Methods

Venom was extracted from the rattlesnake, copperhead, and cottonmouth. Venom was initially obtained by "milking" snakes donated for that purpose by the local zoo, and later from a supply of dried *Agkistrodon piscivorous* venom from Ross Allen's Reptile Institute, Silver Springs, Florida. The venom acquired from the Reptile Institute was a "pooled" sample crystallized by a special process for the purpose of preservation. In order to secure relatively uniform potency, "pooled" venom samples are preferred for experimental use[8].

The dogs used in this experiment were selected at random except for similiar size and weight in the paired groupings illustrated in table 2. The ages of the dogs varied from approximately four months to two years. The physical condition of the dogs was from excellent to only fair because these dogs were "strays" and thus exhibited no uniformity of physical condition.

The minimum lethal dose (m.l.d.) of venom for the dogs was determined by injecting sufficient numbers of animals according to bodyweight *via* the subcutaneous route with graded doses of venom. The site of injection selected was the subcutaneous region of the shoulder, since the majority of dogs are usually struck about the body and not on the lower limbs. Control animals were used in all tests. Demerol[@2] was used when necessary for the alleviation of pain.

Results

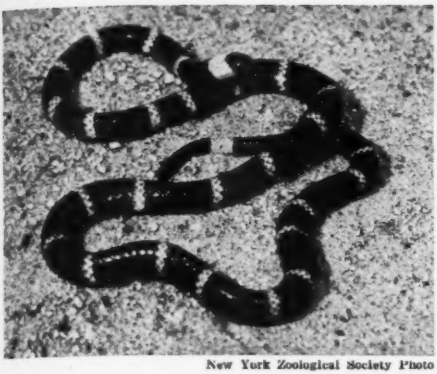
The results indicated that m.l.d. for the average dog is approximately 1 mg. of dried venom per pound bodyweight (approx. 2 mg. per kilogram). It should be recognized that the m.l.d. of snake venom can not be determined with the precise exactness as compared with other substances or drugs. The authors found a variation in this figure depending upon the size of the dog. Larger dogs, on occasions,

TABLE 1. Determination of the (approximate) Minimum Lethal Dose of (*Agkistrodon piscivorus*) Venom in the Dog

Dog	Weight (lb.)	Total Injected (mg.)	Results
1	12	6	Recovered with slough
2	14	7	Recovered without slough
3	11	8	Recovered with slough
4	12	9	Recovered with slough
5	20	20	Died in 27 hours
6	25	25	Died in 49 hours
7	12	18	Recovered with slough
8	40	30	Died in 72 hours
9	14	20	Died in 48 hours
10	20	25	Died in 65 hours

[@1]The drug for this study was supplied through the courtesy of Merck and Company, Inc., Rahway, New Jersey.

[@2]Winthrop Laboratories, New York, N. Y.



New York Zoological Society Photo

Coral Snake (Micrurus fulvius).

seem to require a lower m.l.d. per pound bodyweight than the smaller ones.

The dosage of cortone found to be the most effective was 50 mg. intramuscularly as the initial dose, followed by 25 mg. every eight hours for a period of 50 hours if the dog survived for that length of time. Early cortone therapy is imperative for maximum therapeutic benefit.

Summary

1. For the past ten months, cortisone acetate (cortone® Merck) has been evaluated concerning its effectiveness in the treatment of poisonous snakebite in the dog.

2. The approximate m.l.d. of venom (liquid or crystallized) is 1 mg. per pound bodyweight when injected subcutaneously.

TABLE 2. Degree of Tissue Necrosis and Resultant Sloughing of Skin due to (*Agkistrodon piscivorus*) venom

Dog	Weight (lb.)	Total Injected (mg.)	Treated or Control*	Results
11	25	13	CT	Recovered, no slough
12	16	8	C	Recovered, no slough
13	20	15	CT	Recovered, no slough
14	14	10	C	Recovered, slough
15	12	12	CT	Recovered, slight slough
16	22	22	C	Died in 72 hours, but had sloughed
17	25	25	CT	Died in 79 hours, slight slough
18	12	18	C	Recovered, extensive slough

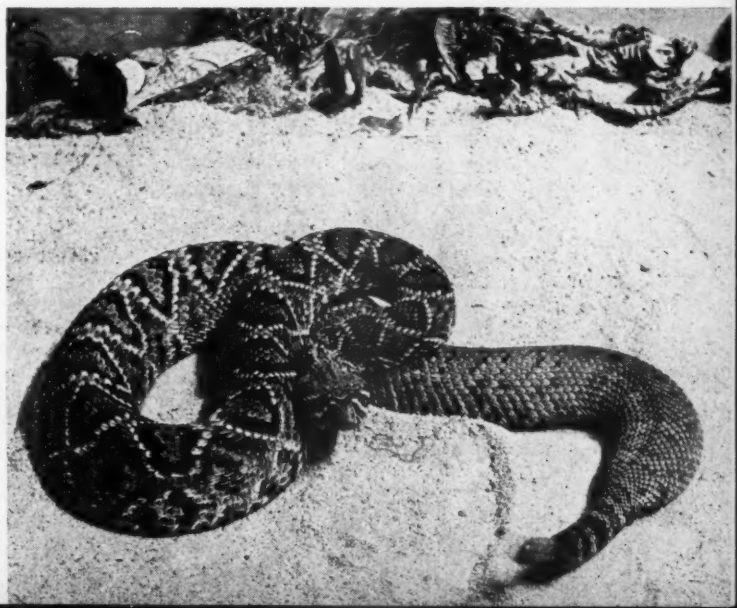
*CT — Cortone treated as described
C — Control (untreated)

This table indicates the therapeutic value of cortone in lowering the incidence and extent of tissue necrosis and sloughing due to poisonous snakebite. Even in the treated animals that evidenced sloughing, the slough was not so extensive as that observed in the untreated controls.

3. The degree of tissue necrosis and resultant sloughing is less in animals receiving cortisone acetate than in untreated controls.

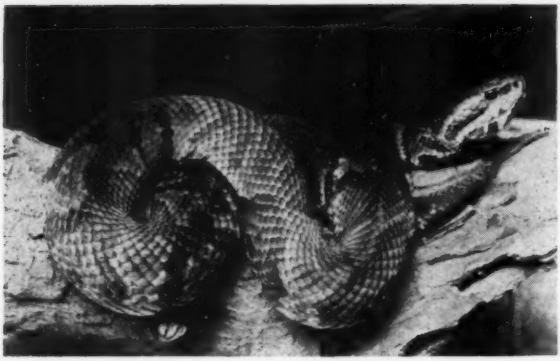
4. The survival time is invariably longer in dogs receiving cortisone acetate than in untreated controls.

5. Cortone treated dogs evidenced milder symptoms, apparently suffered less pain, and



Eastern Diamond-back Rattlesnake (Crotalus adamanteus).

New York Zoological Society Photo



Water Moccasin (Agkistrodon piscivorus).

New York Zoological Society Photo

were more active than those animals not receiving this drug. In addition, the treated animals had better appetites, and in general, were in much better physical condition throughout the experiments than the controls.

Acknowledgments

For the invaluable assistance rendered throughout these studies, the authors wish to express their appreciation to the following persons: E. Ross Allen, Silver Springs, Fla.; Henry M. Parrish, Yale University; C. B. Pollard, University of Florida; Wilfred T. Neill, Silver Springs, Fla.; Warren Prince, Silver Springs, Fla.; Dan Quillian, Jr., Athens, Ga.; John Albin Short, Athens, Ga.; Bill Gleason, Silver Springs, Fla.; Paul L. Piercy, University of Georgia; Eldred W. Causey, University of Georgia; Frank A. Hayes, University of Georgia.

TABLE 3. Survival Time After Injection of Venom (*Agkistrodon piscivorus*)

Dog	Weight (lb.)	Total Injected (mg.)	Treated or Control*	Results
19	20	20	CT	Recovered
20	30	30	C	Died in 47 hr.
21	18	25	CT	Died in 40 hr.
22	14	21	C	Died in 22 hr.
23	10	20	CT	Died in 97 hr. (Treatment stopped after 50 hr.)
24	10	20	C	Died in 25 hr.
25	12	36	CT	Died in 12 hr.
26	12	36	C	Died in 3 hr.
27	30	120	CT	Died in 23 hr.
28	30	120	C	Died in 7 hr.
29	20	60	CT	Died in 29 hr.
30	20	60	C	Died in 23 hr.
31	12	48	CT	Died in 24 hr.
32	10	40	C	Died in 19 hr.

*CT — Cortone treated as described
C — Control (untreated)

The results indicated by this chart show that animals treated with cortisone experience a longer survival than those not treated.

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The Amazing World of Science

To even the most naive, news of exciting possibilities of a new plant growth stimulant emphasizes progress in the amazing world of science.

Eli Lilly and Company has announced that preliminary tests with a new chemical—gibberellic acid—indicate plant growth stimulation of most plants, including trees, by spraying the agent onto leaves, root feeding, injection into the stem, or rubbing onto the stem as a part of a lanolin paste. Under laboratory conditions, gibberellic acid has increased growth rates of some plants by five times.

Serologic Relationship Of Poliomyelitis Virus And The Virus Of Infectious Canine Hepatitis

J. E. PRIER*, D.V.M., Ph.D., Syracuse, New York

INFECTIOUS canine hepatitis (ICH) was described as a distinct clinical entity by Rubarth in 1947. It is possible, of course, that the disease was prevalent but unrecognized for some time before this date. It is now present in most areas of the civilized world where large populations of domestic dogs are maintained.

The virus is primarily endotheliotropic, producing lesions in many parts of the body. Lymph node and tonsillar involvement are typical and encephalitis is a sequela in about 10% of cases. The encephalitic syndrome is sudden in onset, of short duration, and usually fatal. Present knowledge indicates that urine is the primary vehicle for distribution of the virus in nature.

There is no known direct relationship of ICH virus to agents affecting other domestic animals or man and apparently it is distinct from the virus causing hepatitis in man. Difficulty in adapting the ICH virus to experimental hosts has prevented extensive research into its real distribution in nature.

Poliomyelitis virus is apparently specific for man. Examinations for the virus in other species have been made to determine whether animal reservoirs are present. These searches have been consistently negative. Neutralizing antibodies have been found in some animal species[1,2,3,4]. The significance of these findings is not clearly understood. It is possible that certain species may be reservoirs, especially in interepidemic periods. On the other hand, such reactions may merely reflect an antigenic similarity between poliomyelitis virus and some other agent affecting other animal species.

Martin and Goret[5,6] isolated an "hepatoneurotropic" virus from man and showed that the agent was antigenically related to or the same as the Lansing strain of poliomyelitis. Also, rabbit antiserum against the agent had the same serologic reactivity as rabbit antiserum produced against ICH virus.

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The present paper concerns the examination of human serums for complement-fixing antibodies for the virus of infectious canine hepatitis and the serologic relationship of this virus to that of poliomyelitis. The complement-fixation test described by Prier and Kalter[7] was used.

Methods and Materials

Antiserum was prepared against infectious canine hepatitis by injecting mature rabbits intravenously with the supernatant fluids of tissue culture containing ICH virus. Canine kidney cells were used to propagate the virus. Three injections of fluid at seven day intervals were given. Fourteen days after the last injection, animals were bled by cardiac puncture and the serum separated and stored at —5 C. in sealed ampoules. Control rabbits were injected with supernatant fluids of uninfected tissue cultures.

Poliomyelitis antiserum was type specific and prepared by intravenous injection of rabbits with supernatant fluids of infected monkey kidney tissue culture. This material was obtained from Dr. Paul Wehrle of the Department of Pediatrics, State University of New York, Upstate Medical Center.

Normal serums were obtained as pools containing 4-5 individual samples each. All serums were from routine samples submitted for Wassermann tests and had a negative serology for syphilis. Test serums were submitted from hospitalized patients and separated into the following groups according to the general clinical condition: (a) Respiratory disease, (b) encephalitis or other neurologic disease, (c) poliomyelitis, (d) "virus studies". The latter group consisted of acute infections in which no clear-cut syndrome was apparent. In most cases, paired serums were obtained, although the first specimen was often obtained after the disease was well established. Usually, at least seven days elapsed between the first and second samples. Serums were stored at —5 C. in screw-capped lusteroid tubes.

The average reactions of rabbit serums with ICH antigen are summarized in table 1. Al-

though the polio antiserums did not give as high a reaction as the ICH antiserum, they were of sufficient titer to be considered positive. Adsorption of serums on guinea pig kidney suspensions did not remove the reactivity. Positive Wassermann serum did not give a detectable reaction.

TABLE 1. Complement-Fixation Reactions of Infectious Canine Hepatitis Antigen and Anti-Polio and Anti-Infectious Canine Hepatitis Rabbit Serums

	ANTIGEN	
Antiserum	ICH	Control (Normal Liver)
Normal	negative	negative
ICH	1-32	1-4
Polio, Type I	1-8	negative
Polio, Type II	1-16	negative
Polio, Type III	1-8	negative

Table 2 shows the reactions of a group of human patients' serums to ICH antigen. There are insufficient numbers in the neurotropic and "virus studies" groups to draw adequate conclusions. In both the respiratory and poliomyelitis suspect groups, several patients demonstrated a rise in antibodies from the first to the second serum. The results indicate that an appreciably higher percentage of reactions to ICH occur in serums of patients clinically considered as poliomyelitis than in either normal serum or serums of other clinical groups studied.

TABLE 2. Complement-Fixation Reactions of Patients' Serums with Infectious Canine Hepatitis Antigen

Number	Clinical Group	% Showing Reaction (1-8 or greater)
85	Respiratory	10.7
11	Neurotropic	9.0
22	"Virus Studies"	9.5
71	Normal Serum Pools	2.1
48	Poliomyelitis Suspect	22.9

It is not possible to conclude that ICH virus is infective for man. If this should be the case, there is no definite clinical syndrome currently recognized as due to the virus. A more acceptable conjecture might be that the ICH virus and another virus infective for man bear some common antigenic property. This property may be shared, in part, with the polio virus.

Apparently the reaction, if it is due to a common human virus, does not persist for long periods after the infection. If the serologic relationship of ICH to poliomyelitis is due to a high degree of similarity of the agents, a higher incidence of positive C-F reactions might be expected in normal human serums. It is not unusual, however, for C-F reactions to be transitory, especially in systems that give only relatively low titers.

Additional study is needed to correlate the C-F reactions of human serums with the neutralizing indexes of the same serums for both polio and ICH viruses. The possible relationship of ICH virus to the so-called "orphan" agents that may confuse the diagnosis of poliomyelitis also has not been examined.

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Preputial Catarrh

Preputial catarrh, septic balantitis, or infection of the parietal and visceral sheet adherent to the glans penis in the dog is referred commonly to practitioners. Irrigation of the prepuce frequency gives only temporary relief of symptoms manifested as a purulent discharge. Cauterization of both the superficial sheets adherent to and adjacent to the bulbous glandus with silver nitrate sticks followed by bland ointment satisfactorily relieves symptoms, according to Dr. R. A. Stocking, Los Angeles practitioner.

Bradley's Topographical Anatomy of the Dog, states that the parietal and viseral layer lining the prepuce is modified integument resembling mucous membrane. The surface looking toward the dorsal surface of the glans penis is longitudenally folded and studded with irregular rows of flattened, rounded elevations caused by masses of lymphoid tissue.

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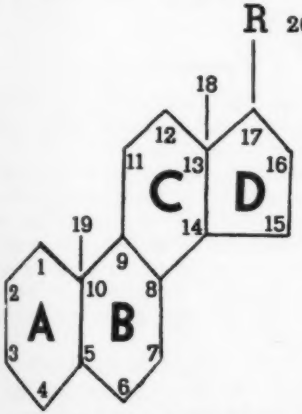
Mexican scientists have reported favorable results in the treatment of human brucellosis following oral tetracycline therapy. The authors report clinical observations in *Antibiotic Medicine* for February 1956.

A Survey Of Adrenocortical Hormone Nomenclature And Dosage Forms

M. J. SILVERMAN, D.V.M., B.Sc., M.Sc., Philadelphia, Pennsylvania

OF the many steroid compounds known to man, perhaps none have created as much hope for the future, and at the same time, as much confusion, as the adrenal cortex hormones and their synthetic analogues. The structural nucleus of these steroids, as well as that of digitalis and strophanthus glycosides, bile acids and cholesterol, red and white squill glycosides, male and female sex hormones, and many others, is the cyclopentano-perhydrophenanthrene structure.



From the adrenal cortex, nearly 30 crystalline steroids have been isolated, of which only seven have been shown to exert a significant biological effect related to adrenal cortical function. Structurally all of the adrenal cortical steroids are alike, inasmuch as they contain 21 carbon atoms, an alpha, beta-unsaturated ketone in ring A, and an alpha-ketol side chain (—$COCH_2OH$) attached to ring D. They differ in the extent of oxygenation or hydroxylation at carbons 11 and 17.

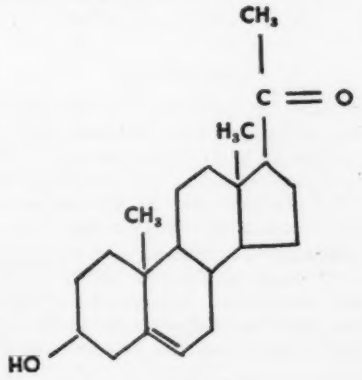
These steroids may be divided dependent upon whether their predominant biological effect is related to electrolyte and water metabolism, or to carbohydrate and protein metabolism. Those in the first mentioned group are called "mineralocorticoids," and the second group "glucocorticoids." It should be remembered, however, that although the mineralocorticoids' effect on carbohydrate and protein metabolism are practically nil, the glucocorticoids have a pronounced action on water and electrolyte metabolism.

With the very fine work done over the past few years by many individuals and several pharmaceutical concerns, has come a profusion of names which is in all probability the main source of confusion among practitioners. It will be the purpose of this brief survey to eliminate as far as possible this nomenclatural problem.

Desoxycorticosterone, as its name indicates, lacks an oxygen atom at position 11 in the steroid nucleus. It is classified as a mineralocorticoid; that is, its action is limited chiefly to electrolyte and water regulating function. By comparison, cortisone and hydrocortisone both contain an oxygen at position 11 and also at position 17. Hence, classification of adrenal cortex hormones may also be made on this chemical structure basis, *i.e.* 11-desoxysteroids, and 11,17-oxysteroids. Apparently, the addition of an oxygen at position 11 produces an increased potential for regulating gluconeogenesis (glucocorticoids).

Pregnenolone

This synthetic oxidation product of cholesterol (or stigmasterol) has a structure which may be represented as follows:



Pregnenolone

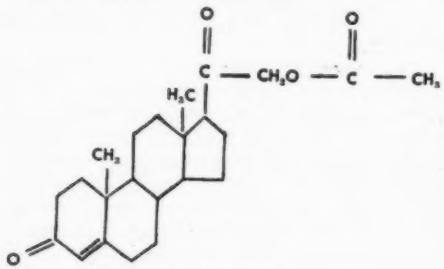
This steroid was among those agents used in the treatment of rheumatoid arthritis prior to the advent of cortisone. It was the apparent value of this type of product which stimulated further investigations among steroids for similar or improved action.

Desoxycorticosterone

Desoxycorticosterone is official in the U.S.P. as the acetate. It was first isolated from the adrenal cortex in 1938, and has since been synthesized from stigmasterol, a phytosterol obtained from soya bean.

Desoxycorticosterone has also been referred to as Reichstein's "substance Q," and Kendall's "desoxy compound B."

The acetate ester is known as DCA, DOCA, deoxycostone acetate, deoxycortone acetate, and by various trade names.



Desoxycorticosterone acetate

Due to its virtual insolubility in water, desoxycorticosterone is usually administered intramuscularly as an oil solution of the acetate ester.

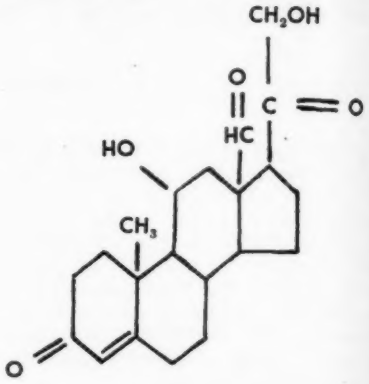
A repository form has been formulated utilizing microcrystalline desoxycorticosterone trimethylacetate in isotonic sodium chloride solution with methylcellulose and tween 20®*. Its effect is evidenced in about 48 hours, and may persist for five to six weeks.

Aldosterone

Formerly known as "electrocortin," this product is apparently an aldehyde, but in solution is thought to exist as a hemiacetal. It has been isolated from hog and beef adrenals and appears to be identical with a sodium-retaining corticoid present in human urine.

Aldosterone is classified as a mineralocorticoid. It shows no effect on carbohydrate and protein metabolism. It produces a retention of sodium, chloride, and water, and promotes excretion of potassium. It has been used with some degree of therapeutic effectiveness in Addison's disease.

The structure of this steroid may be represented as follows:

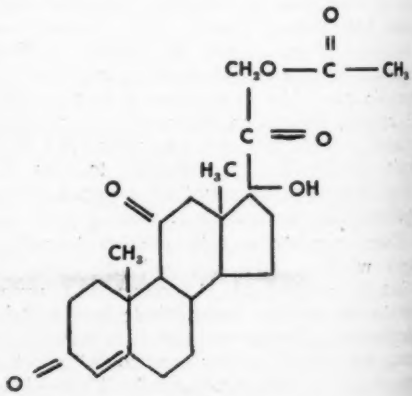


Aldosterone

Cortisone

Cortisone has been referred to by many names, among which are Kendall's "compound E", Wintersteiner's "compound F", and Reichstein's "substance Fa". It too can be obtained from the adrenal cortex or prepared synthetically. Cortisone, like desoxycorticosterone, is practically insoluble in water, is stable in air, but sensitive to light. Parenteral forms of cortisone are primarily suspensions in water maintained by the use of a surfactant and a suspending agent.

Cortisone is also official in the U.S.P. in the acetate form. Its structural formula may be represented as follows:

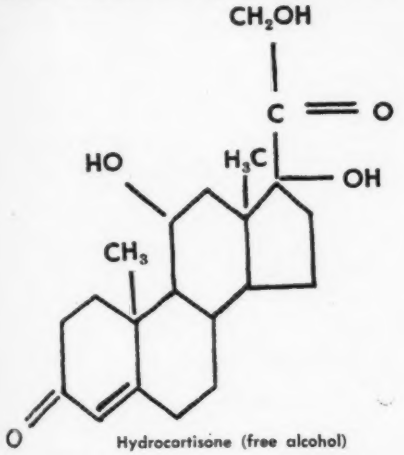


Cortisone acetate

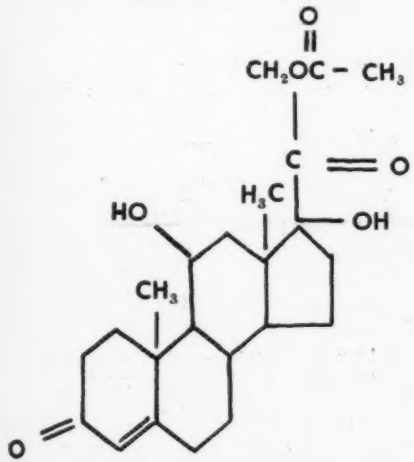
*Polyoxyalkalene ether of partial lauric acid ester. ®Atlas Powder Company, Wilmington, Del.

Hydrocortisone

Hydrocortisone is official in the U.S.P. both as the free alcohol and as the acetate. The structural formulae are represented as follows:



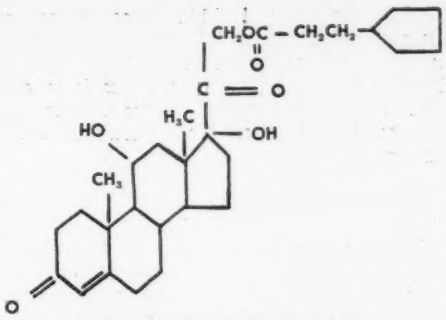
Hydrocortisone (free alcohol)



Hydrocortisone acetate

Hydrocortisone has been referred to also as compound F, and Reichstein's "substance M". The free alcohol form is very slightly soluble in water, whereas the acetate is practically insoluble in water. Both are sensitive to light. The free alcohol form is more rapidly absorbed from an intramuscular injection site than the acetate, hence a more prompt effect is obtained.

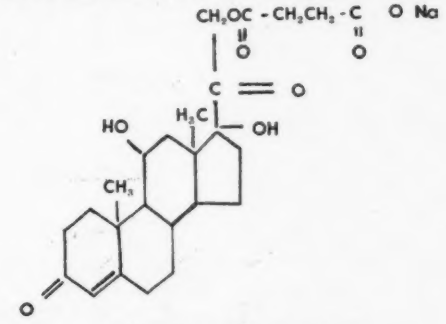
An ester and ester-salt of hydrocortisone are also available at present. The ester, hydrocortisone cyclopentylpropionate, is of value in oral suspensions because of its slower absorption from the intestinal tract and also because of it greater palatability.



Hydrocortisone cyclopentyl-propionate

This ester is also insoluble in water.

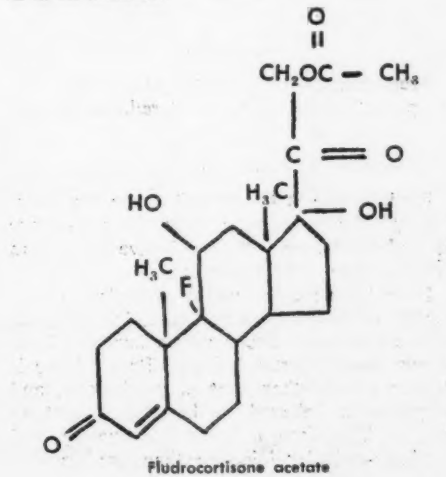
The ester-salt, hydrocortisone sodium succinate, is freely soluble in water, thus making available a dosage form which can be injected into the vein over a short period of time.



Hydrocortisone sodium succinate

Fludrocortisone

Fludrocortisone is the 9-alpha-fluoro derivative of hydrocortisone. The structural formula is as follows:



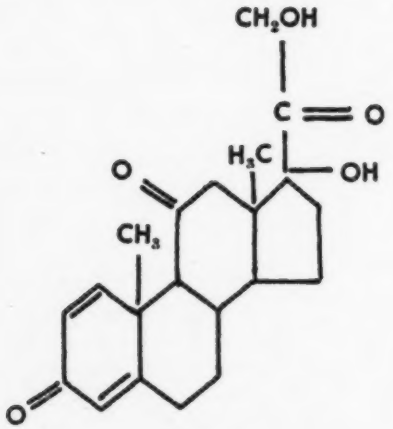
Fludrocortisone acetate

It is listed in the 1956 N.N.R. as the acetate. Its anti-inflammatory and antipruritic potency is purported to be ten to 25 times that of hydrocortisone. Although a tablet form and an intra-articular suspension were investigated, at present only topical preparations are available commercially.

Prednisone

Prednisone is the generic name for delta-1-dehydrocortisone. It is a synthetic analogue of cortisone having similar but more potent anti-inflammatory therapeutic action. In general, the activity of prednisone seems to be approximately three to five times greater than that of cortisone or hydrocortisone.

Originally, the name metacortandracin had been assigned to this product, but was later changed to prednisone. Its structural formula is represented as follows:



Prednisone

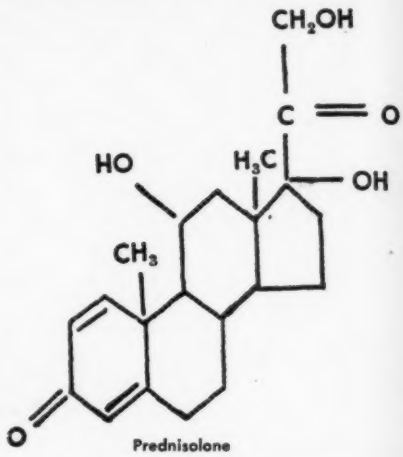
Prednisone is useful in the same manner as the parent compounds, but at reduced dosage.

Prednisolone

Prednisolone is the generic name for delta-1-dehydrohydrocortisone, a synthetic analogue of hydrocortisone. It is effective in 1/5 to 1/3 the dose of hydrocortisone.

Indications for the use of prednisolone are similar to its parent compound, but again at reduced dosage. Prednisolone has also been known as metacortandralone. Its solubility is slightly greater than that of prednisone, and therefore is believed to be less irritant to tissues. Therefore, it is more frequently used for intra-articular injection than prednisone.

Its structural formula may be represented as follows:



Prednisolone

Specialties Containing Adrenal Cortical Hormones†

Adrenal Cortical Extracts. (Adrenal cortical extracts are customarily mixtures containing several steroids.)

- Adreno-Cortin (Harrower)[1]
- Cortalex (Upjohn)[2]
- Cortinoral (Harrower)[1]
- Cortisorbate (Schieffelin)[3]
- Cortivite (United)[4]
- Eschatin (Parke, Davis)[5]
- Glycortal Pills (Schieffelin)[3]
- Lipo-Adrenal Cortex (Upjohn)[2]

Cortisone.

- Cortisone Acetate—
  - Cortagen Acetate (Schering)[6]
    - Injection, 25 mg./ml.
    - Ophthalmic drops, 5 mg./ml. and 25 mg./ml.
    - Tablets, 5 mg. and 25 mg.
  - Cortone Acetate (Sharp and Dohme)[7]
    - Ophthalmic Ointment, 1.5%
    - Ophthalmic Suspension, 0.5% and 2.5%
    - Saline Suspension, 25 mg./ml.; 50 mg./ml.
    - Tablets, 5 mg., 25 mg.
  - Isopto-Cortisone (Alcon)[8]
    - Ophthalmic Suspension, 0.5% and 2.5%
- Cortisone Acetate with an Antibiotic—
  - Cortone with Bacitracin (Sharp and Dohme)[7]

†For manufacturers name and address, see addendum.

Ophthalmic Ointment, 1.5%
Neosone (Upjohn)[8]
Ophthalmic Ointment, 1.5% with 0.5% neomycin sulfate
Cortisone Acetate with an Antihistamine—
Corticloron (Schering)[6]
Sterile suspension for eye and nose (0.5% with 0.25% chlor-trimeton®)
Cortisone Acetate with a Salicylate—
Neocylate with Cortisone (Central Pharmacal Co.)[9]
Tablets (enteric coated) — 5 mg. with 0.25 gm. ammonium salicylate
Salcort (Massengill)[10]
Tablets — 2.5 mg. with 0.3 gm. sodium salicylate
Cortisone Acetate with a Sulfonamide—
Cortomyd (Schering)[6]
Ophthalmic Suspension (1.5% with 10% sulfacetamide sodium)

Desoxycorticosterone.

Desoxycorticosterone Acetate—
Cortate (Schering)[6]
Injection (in oil) — 5 mg./ml.
Pellets — 75 mg. (for subcutaneous implantation)
Buccal tablets — 2 mg.
Decortin (Schieffelin)[8]
Injection (in oil) — 5 mg./ml.
Decosterone (Barry)[11]
Injection (aqueous suspension)
Injection (in oil)
DOCA Acetate (Organon)[12]
Injection, 5 mg./ml.
Percorten Acetate (Ciba)[13]
Injection, 5 mg./ml.
Buccal tablets, 2 mg.
Pellets, 125 mg.
Desoxycorticosterone Trimethylacetate—
Percorten trimethylacetate (Ciba)[13]
Injection, 25 mg./ml.

Fludrocortisone.

Fludrocortisone Acetate—
Alflorone Acetate (Sharp and Dohme)[7]
Lotion, 0.1% and 0.25%
Topical ointment, 0.1% and 0.25%
F-Cortef (Upjohn)[8]
Topical ointment, 0.1% and 0.2%
Florinef (Squibb)[14]
Lotion, 0.05%, 0.1% and 0.2%
Topical ointment, 0.1% and 0.2%
Fludrocortisone with Antibiotics—
Florinef-S (Squibb)[14]
(with neomycin and gramicidin)
Lotion, 0.05% and 0.1%
Ophthalmic ointment, 0.1%
Ophthalmic suspension, 0.1%
Topical ointment, 0.1%

Hydrocortisone.

Hydrocortisone—
Cort-Dome (Dome)[15]
Lotion, 0.5%, 1% and 2%
Topical ointment, 1% and 2%
Cortef (Upjohn)[8]
Fluid, 10 mg./5 ml.
Sterile solution, 100 mg./20 ml.
Sterile solution (Solu-Cortef) as the sodium succinate ester-salt, 100 mg./10 ml.
Tablets, 5, 10, and 20 mg.
Cortifan (Schering)[6]
Cream, 1%
Cortril (Pfizer)[16]
Tablets, 10 mg. and 20 mg.
Topical ointment, 1% and 2.5%
Hydrocortone (Sharp and Dohme)[7]
Infusion concentrate, 0.5%
Lotion, 0.5% and 1%
Tablets, 5, 10, and 20 mg.
Isopto Hydrocortisone (Alcon)[8]
Ophthalmic drops, 0.5% and 2.5%
Topicort Spray (Roussel)[17]
Aerosol spray, 0.5%
Hydrocortisone with Antibiotic—
Achromycin with Hydrocortisone (Lederle)[18]
Ophthalmic ointment, 1.5% with 1% tetracycline hydrochloride
Topical ointment, 2% with 3% tetracycline hydrochloride
Bacimycin with Hydrocortisone (Walker)[19]
(with bacitracin and neomycin)
Ophthalmic and topical ointment, 1%
Cortisporin (Burroughs-Wellcome)[20]
Ophthalmic ointment, 1%
Topical ointment (with polymyxin B sulfate, bacitracin, and neomycin sulfate)
Otic drops, 1%
Terra-Cortril (Pfizer)[16]
Topical ointment, 1% with 3% terramycin®
Hydrocortisone with Salicylate—
Armyl-F (Armour)[21]
Tablets, 2 mg. with 0.3 gm. potassium salicylate
Hydrodyne (Sharp and Dohme)[7]
Tablets, 2.5 mg. with 0.3 gm. acetylsalicylic acid
Pabalate — HC (Robins)[22]
Tablets, 2.5 mg. with 0.3 gm. potassium salicylate

Hydrocortisone Acetate—
Cortef Acetate (Upjohn)[8]
Injection, 50 mg./ml.
Topical ointment, 1% and 2.5%
Cortril Acetate (Pfizer)[16]
Injection (aqueous suspension), 25 mg./ml.
Ophthalmic ointment, 0.5% and 2.5%
Hydrocortone Acetate (Sharp and Dohme)[7]
Dental ointment, 2.5%
Ophthalmic ointment, 1.5%
Ophthalmic suspension, 0.5% and 2.5%
Saline suspension, 25 mg./ml.
Topical ointment, 1% and 2.5%

Hydrocortisone Acetate with Antibiotics—
Chloromycetin-Hydrocortisone Ophthalmic (Parke-Davis)[8]
Drops*, 0.25% chloromycetin® and 0.5% hydrocortisone
Corbiot (Upjohn)[8]
(with neomycin, penicillin, and polymyxin)
Single dose applicator tubes, 20 mg.
Hydroderm (Sharp and Dohme)[7]
(with neomycin and bacitracin)
Topical ointment, 1% and 2.5%
Hydroptic (Sharp and Dohme)[7]
(with neomycin)
Ophthalmic suspension, 0.5% and 2.5%
Neo-Cortef (Upjohn)[8]
(with neomycin)
Cream, 1% and 2.5%
Eye-Ear drops, 0.5% and 1.5%
Eye-Ear ointment, 0.5% and 1.5%
Lotion, 1%
Topical ointment, 0.5%, 1%, and 2.5%
Terra-Cortril (Pfizer)[16]
(with terramycin)
Ophthalmic Suspension, 1.5%

Miscellaneous Hydrocortisone Combinations—
Hydrobalm (Sharp and Dohme)[7]
Cream, 0.5% (with calamine)
Pantho-F (U.S. Vitamin)[23]
Cream, 1% (with 2% pantothenylol — panthoderm® cream)
Tarcortin (Reed and Carnrick)[24]
Cream, 0.5%* (with 5% coal tar in hydrophilic base)

Prednisolone.

Prednisolone—
Delta-Cortef (Upjohn)[8]
Tablets, 5 mg.

*Supplied as powder, to be reconstituted prior to use.

Hydeltra (Sharp and Dohme)[7]
Tablets, 1 mg., 2.5 mg., and 5 mg.
Meticortelone (Schering)[6]
Capsules, 2.5 mg. and 5 mg.
Injection, 25 mg./ml.
Tablets, 1 mg., 2.5 mg. and 5 mg.
Meti-Derm (Schering)[6]
Cream, 0.5%
Metimyd (Schering)[6]
(with 10% sulfacetamide)
Ophthalmic suspension, 0.5%
Sterane (Pfizer)[16]
Injection, 10 mg./ml.
Tablets, 1 mg. and 5 mg.

Prednisolone with Antacids—
Co-Hydeltra (Sharp and Dohme)[7]
Tablets, 2.5 mg. and 5 mg.

Prednisolone with Antibiotics—
Hydeltracin (Sharp and Dohme)[7]
(with neomycin)
Lotion, 0.5%
Meti-Derm (Schering)[6]
(with neomycin)
Ointment, 0.5%
Metimyd (Schering)[6]
(with neomycin and 10% sulfacetamide)
Ointment, 0.5%
Neo-Delta-Cortef (Upjohn)[8]
(with neomycin)
Eye-Ear drops, 0.25%
Eye-Ear ointment, 0.25%
Lotion, 0.5%
Topical ointment, 0.5%

Prednisolone with Salicylate—
Cordex (Upjohn)[8]
Tablets, 0.5 mg. (with 0.3 gm. acetylsalicylic acid)
Cordex Forte (Upjohn)[8]
Tablets, 1.5 mg. (with 0.3 gm. acetylsalicylic acid)

Prednisone.

Prednisone—
Deltasone (Upjohn)[8]
Tablets, 5 mg.
Deltra (Sharp and Dohme)[7]
Tablets, 1 mg., 2.5 mg. and 5 mg.
Meticorten (Schering)[6]
Capsules, 2.5 mg. and 5 mg.
Injection, 10 mg./ml.; 40 mg./ml.
Tablets, 1 mg., 2.5 mg. and 5 mg.

Prednisone with Antacids—
Co-Deltra (Sharp and Dohme)[7]
Tablets, 2.5 mg. and 5 mg.

Prednisone wih Antihistamine—
Metreton (Schering)[6]
(with chlor-trimeton and ascorbic acid)

Tablets, 2.5 mg.
Prednisone with Salicylate—
Sigmagen (Schering)[9]
Tablets, 0.75 mg. (with 0.325 gm. acetylsalicylic acid)

Pregnenolone.

Pregnenolone (also acetate)
Enelone (Arlington-Funk)[25]
Injection, 100 mg./ml. (aqueous suspension)
Tablets, 100 mg.
Enescorb (Arlington-Funk)[25]
(with vitamin C)
Tablets
Natolone (National Drug)[26]
Injection, 100 mg.
Tablets, 50 mg. and 100 mg.
Sharmone (Sharp and Dohme)[7]
Tablets, 100 mg.

This list is not intended to represent a complete survey of all products available. Dosage forms of no practical value in veterinary medicine have not been included. Extemporaneous preparations have been utilized to a great extent in veterinary practice, and although the commercial nasal drops and sprays have not been used in their commercial packaging, hydrocortisone and combined suspensions have been used successfully as pharyngeal sprays in horses making use of lengths of plastic tubing.

REFERENCES

Osol, A. and Farrar, G. E., Jr., United States Dispensatory, 25th ed., Lippincott, Philadelphia, 1955, p. 425.

Kral, F., Personal communication.

Martin, E. W., and Cook, E. F., Remington's Practice of Pharmacy, 11th ed., Mack, Easton, Pa., 1956.

The Pharmacopeia of the United States, 15th Revision, Mack, Easton, Pa., 1955.

ADDENDUM

1. The Harrower Laboratory, Inc., 930 Newark Ave., Jersey City, N. J.
2. The Upjohn Co., Kalamazoo, Mich.
3. Schieffelin & Co., 16-30 Cooper Square, New York, N. Y.
4. United Laboratories, Ltd., 333 S. Fair Oaks Ave., Pasadena, Calif.
5. Parke, Davis & Co., Detroit, Mich.
6. Schering Corp., Bloomfield, N. J.
7. Merck Sharp & Dohme, Philadelphia, Pa.
8. Alcon Laboratories, Inc., 1400 Henderson, Ft. Worth, Tex.
9. Central Pharmacal Co., Seymour, Ind.
10. S. E. Massengill Co., Bristol, Tenn.
11. Barry Laboratories, Ind., 9100 Kercheval, Detroit. Mich.
12. Organon, Inc., 20 Main St., Orange, N. J.
13. Ciba Pharmaceutical Products, Inc., 556 Morris Ave., Summit, N. J.
14. E. R. Squibb & Sons, 745 Fifth Ave., New York, N. Y.
15. Dome Chemicals, Inc., 109 W. 64th St., New York, N. Y.
16. Chas. Pfizer & Co., Inc., Brooklyn. N. Y.
17. Roussel Corp., 155 E. 44th St., New York, N. Y.
18. Lederle Laboratories Div., American Cyanamid Corp., Pearl River, N. Y.
19. Walker, Corp. & Co., 406 Ash St., Syracuse, N. Y.
20. Burroughs-Wellcome & Co., (U.S.A.) Inc., Tuckahoe, N. Y.
21. Armour Veterinary Laboratories, Kankakee, Ill.
22. A. H. Robins Co., Inc., 1711 Ellen Rd., Richmond, Va.
23. U. S. Vitamin Corp., 250 E. 43rd St., New York, N. Y.
24. Reed & Carnrick, 155 Van Wagenen Ave., Jersey City, N. J.
25. Arlington-Funk Laboratories, Inc., 250 E. 43rd St., New York, N. Y.
26. The National Drug Co., 4663 Stenton Ave., Philadelphia, Pa.

NOTE: *Some figures illustrating structure of various adrenocorticol hormones inaccurately position carbon bond at the D-ring. Correction was impossible when discovered since figures were prepared as zinc etchings. The editor expresses apologies to the discerning reader.*

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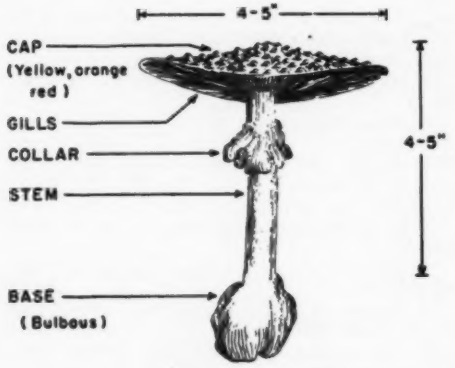
Quack Remedies

Since veterinarians, together with others in allied medical professions, are familiar with the therapeutic properties of most drugs, vegetable and chemical, it is interesting to note the composition of alleged internal cancer cures as advertised by a concern with headquarters in Dallas, Texas, and Portage, Pa. Among the so-called "cures" are black pills, red pills, a brownish black liquid, and, a light red liquid. The black pills and the brownish black liquid are reported to contain iodide of potash, licorice, red clover blossoms, burdock root, stillingia root, berberis root, poke root, cascara sagrada, prickly ash bark, and brickthorn powder. The red pills are said to contain iodide of potash, red clover, stillingia root, poke root, brickthorn bark, and pepsin. The light red liquid is reported to be iodide of potash in elixir of lactated pepsin. The purveyors of these "cures" and the clinic connected with it have been enjoined by the U. S. District Court from shipping the preparations interstate with the implication that they are cures for any type of internal cancer.

Mycetism in a Dog

A case report of mycetism in a dog prepared by Dr. John G. Martin, Boone, N. C. appeared in VETERINARY MEDICINE for May 1956 (page 227).



AMANITA MUSCARIA

The illustration above is reproduced to assist readers in identification of a common representative of the poisonous species concluded responsible for toxic symptoms. Illustration furnished through the courtesy of Dr. Kenneth B. Haas, Kalamazoo, Mich.

▼ ▼ ▼

Meprobamate in Canine Medicine: Summary of 77 Cases

R. A. HUEBNER, V.M.D.,
Philadelphia, Pennsylvania

In the progress of medicine, search for an ideal sedative and relaxant has been continuous. The agents employed clinically have included chloral hydrate, bromides, paralydehyde, barbiturates, and other related derivatives but all have carried the risks of addiction, of the development of tolerance, and of toxicity.

A recently introduced aggregation of drugs called ataraxics have received a great deal of attention. They may be divided into two broad groups: (1) Those characterized by effects on the autonomic nervous system, and (2) those acting on the central nervous system without affecting autonomic functions.

The first group includes chlorpromazine and reserpine (and other Rauwolfia alkaloids) while the second group is represented by mephenesin and other propanediol derivatives. Initially, studies of the drugs in the second group suggested considerable promise but, generally, the disadvantage was inconsistency or short duration of action.

However, a new longer-acting propanediol derivative with marked muscle relaxant properties, meprobamate (2, methyl-2-n-propyl-1, 3-propanediol dicarbamate)*, has been found by the medical profession to be effective in the control of anxiety neuroses and tension states from various causes[1, 2, 3, 4, 5]. Because of its safety and effectiveness, general uniformity of action, freedom from side reactions and comparative lack of impairment of consciousness, it appears to be indicated in the control of hyperexcitable, nervous, and/or unruly dogs.

Meprobamate was used in oral doses of from 100 to 400 mg. two to four times a day (depending on body weight and degree of excitation) on 77 dogs by ten practicing veterinarians. A brief summary of their collective experience includes:

Diagnosis	Satisfactory Response	Unsatisfactory Response
Carsickness	10	3
Hyperexcitability	13	1
Hysteria	1	
Idiopathic pruritus	1	
Idiopathic vomiting		1
Lameness (drug as aid in diagnosis)	1	
Nervousness	14	1
Protrusion intervertebral disc		1
Shyness	3	
Unruliness	13	1
Viciousness	6	
Virus infection (distemper, hard pad disease)	2(?)	5

Admittedly, the general classifications above relating to the animals' response to environment are indefinite and are decided basically on the observers' personal experience. Nonetheless, the small animal practitioner is familiar, unhappily, with these variations in canine psyche.

In summary, it appears that meprobamate has indications in small animal practice essentially similar to those in human medicine: (1) Anxiety and tension states, (2) neurological conditions with associated muscle spasm, (3) muscle spasms due to rheumatic conditions. By blocking abnormal stimuli in the long interneuronal circuits, especially those be-

*Equanil (trade mark), Wyeth Laboratories, Philadelphia, Pa.

tween the cortex, thalamus and hypothalamus, it reduces psychic, as well as skeletal, muscular tension.

Acknowledgment

Gratitude is extended to the ten practitioners who cooperated by submitting the case reports on the patients listed above:

Dr. C. F. Batory, Lancaster, Pa.
Dr. L. B. Davis, Clementon, N. J.
Dr. M. J. Deubler, Philadelphia, Pa.
Dr. J. R. Emas, Lansdowne, Pa.
Dr. W. C. Glenney, Ardmore, Pa.
Dr. A. Hillerson, Springfield, Pa.
Dr. R. B. Koger, Joplin, Mo.
Dr. N. I. Linde, Irvington, N. J.
Dr. H. J. Magrane, Mishawaka, Ind.
Dr. R. C. Snyder, Philadelphia, Pa.

REFERENCES

1. Borrus, J. C., Study of Effect of Miltown (2-methyl-2-n-propyl-1, 3-propanediol dicarbamate) on Psychiatric States. *Jour. Am. Med. Assn.*, 157:1596, 1955.
2. Selling, L. S., Clinical Study of a New Tranquilizing Drug. *Jour. Am. Med. Assn.*, 157:1594, 1955.
3. Lemere, F., New Tranquilizing Drugs, *Northwest Med.*, 54:1098, 1955.
4. Berger, F. M., Meprobamate its Pharmacologic Properties and Clinical Uses. *Internat. Rec. M.*, 169:184, 1956.
5. Dickel, H. A., Dixon, H. H., Wood, J., Shanklin, J. G., Electromyograhic Studies on Patients treated with Meprobamate. *West. Jour. Surg.*, 64:197, 1956.

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Changing Syndrome of Canine Distemper

Carefully documented recording of an outbreak of distemper among war dogs is presented by Singelton and Hunter (*Vet. Rec.*, 68:21 [Jan. 14], 1956).

Management of dogs, ranging in age from nine months to two years, included isolation of new arrivals at the kennels for a period averaging two weeks. On arrival each dog received a small dose (10 cc.) of distemper antiserum. When an animal was selected for training into the main compound, an injection of egg-adapted virus vaccine was administered. Interval between injections averaged 12 days.

The outbreak reviewed affected 33 dogs, or approximately 25% of animals passing through the kennel during a specific period. Initial sign of illness was anorexia, associated with elevated body temperatures. Several days later 75% of isolated patients exhibited a copious nasal discharge. Pneumonia was diagnosed clinically in 35% of those affected. Gastrointestinal disturbances (diarrhea) was recorded in 35% of cases, occurring particularly during the early stages of illness. Clinical central nervous disturbances affected relatively few patients (two destroyed after convulsions developed—five others exhibited muscular incoordination). Histological study of nervous tissues of some dogs not suspected of having central nervous complications demonstrated significant micropathological lesions of the central nervous system. Capability of virus to attack more than one tissue or body system simultaneously was emphasized.

Treatment

Naso-ocular discharge responded to administration of streptomycin, suggesting the bacterial origin responsible for upper respiratory symptoms. No chemotherapeutic or biological treatment appeared to alter course after initial symptoms appeared. Supportive measures were considered valuable aid to recovery. In extensive laboratory studies the authors are impressed with the apparent changeability of the virus. Their studies suggest the virus to be a complex rather than a homogenous entity. They also consider "unlikely" that the hyperimmune serum given might have influenced the development of immunity following injection of egg-adapted vaccine. This appears to be a questionable concept considering recently published information relating to interfering levels of immunity (see VETERINARY MEDICINE, 51:427 [Sept.], 1956).

▼ ▼ ▼

Effect of Stilbestrol on Growth in Mink

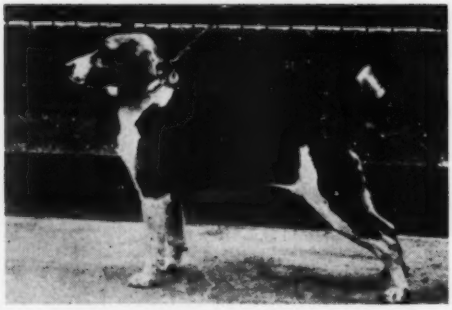
In experiments[8] conducted at the Fur Animal Experiment Station at Ithaca, N. Y., it was concluded that daily intake levels of 10 micrograms or more of stilbestrol were harmful to growing mink. Mink fed at such levels were shorter, smaller, and thinner than those not fed the synthetic hormone.

It was also reported that a like quantity (10 micrograms) of stilbestrol per mink daily fed during the breeding season affected adversely number of kits born. Half this amount, however, appeared not to influence mature breeders.

[8]Basset, C. F., and Travis, H. F., The Effect of Stilbestrol on Growing Mink, *Am. Fur Breeders*, July 1956, p. 18.

Successful Artificial Insemination in Dogs

Some time ago the Gaines Dog Research Center arranged for an experiment in artificial insemination in dogs. The cooperation of Dr. A. E. Harrop, lecturer in animal husbandry at the Royal Veterinary College, University of London, England and Dr. E. P. Leonard, professor and head of the Department of Therapeutics and Small Animal Diseases, New York State Veterinary College, Cornell University, was obtained and plans made for air shipment of canine semen from England to the United States. According to press release, the first litter of five Beagle puppies resulting from an international shipment of canine semen was reported by the Center early in July.



Dam—seven-year-old Susan of VorVan Ett and litter of five puppies by artificial insemination. Sire (lower) British Beagle North Hertfordshires Faerie. Collected semen was diluted in boiled milk and shipped under refrigeration by air transport.

Artificial insemination of bitches by direct transfer of semen to selected bitches has been performed by veterinary practitioners for some years. It is not uncommon for breeders to request such service for unmanageable bitches or for other reasons. Experience with preserved semen is limited and survival time ordinarily is short. In this case, the preserved semen was inseminated 140 hours after collection.

Details of the successful project will be presented by Doctor Leonard at the Gaines Veterinary Symposium scheduled to convene at Kankakee, Ill. in October 24, 1956.

▼ ▼ ▼

Ferrets

Ferrets are discussed by T. Hume Bissonnette*, Trinity College. The domesticated ferret is believed by some to be an albino variant of the wild polecat. They interbreed with the polecat readily. The brown ferret of England is believed to be a cross between the ferret and the polecat.

Ferrets are easily tamed. Neither sex exhibits any fear of man or lower animals. They are vicious biters when teased. Like weasels and polecats, if loose in a chicken coop, they kill for pure joy. Unlike polecats, they are sensitive to cold and dampness and are susceptible to a fatal foot-rot caused by an itch mite. When angered or excited, they emit an extremely offensive nauseating odor.

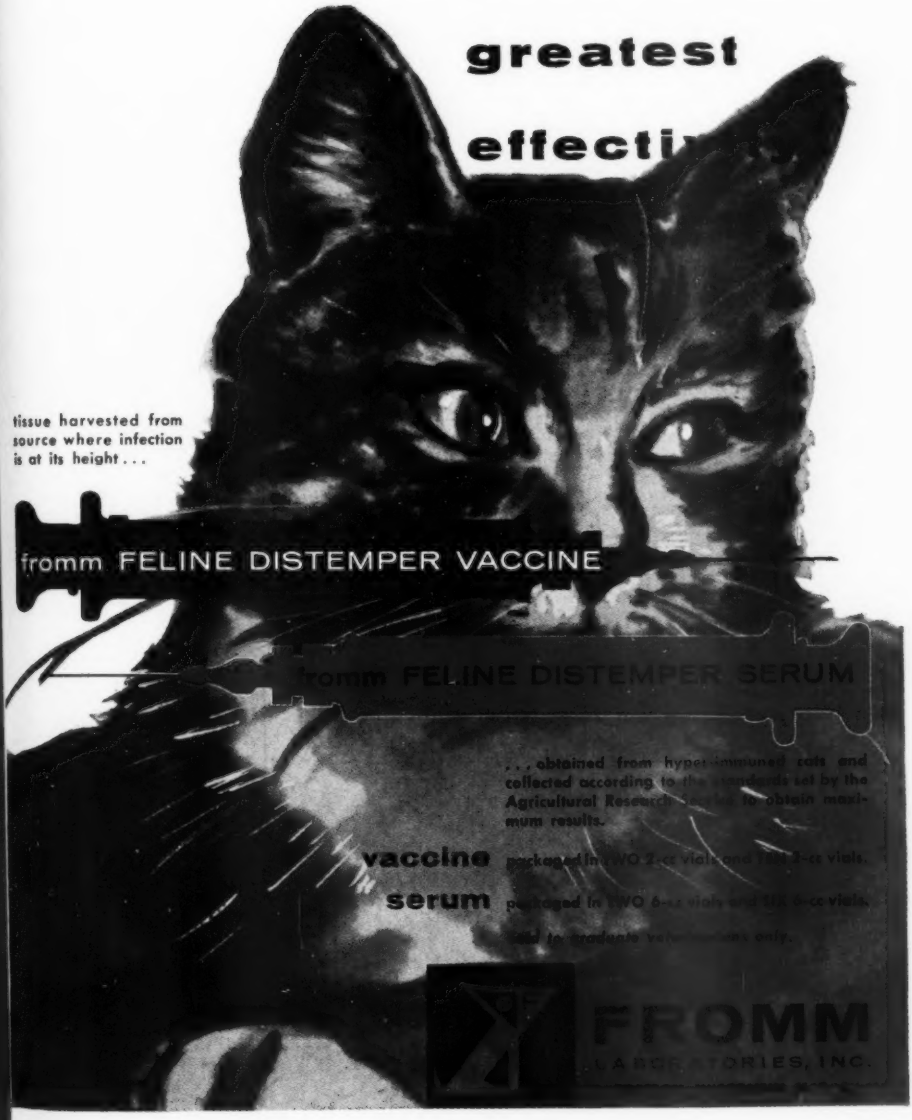
In nature, ferrets will not breed from early September to March but by controlled lighting they can be made to breed the year around. In the unmated female, estrum is continuous from March to August. Gestation period is 42 days. As in the rabbit and cat, ovulation occurs only after coitus or other sexual stimulation. Successful copulation lasts from ten minutes to three hours. The os penis is almost as long as the femur and of about one-half the diameter of the latter.

Ferrets are extremely susceptible to canine distemper, feline distemper, and to human influenza viruses.

▼ ▼ ▼

The practice of veterinary medicine came into being because of man's concern for animals. Animals have become important not only for food but for the production of power, for recreation, and companionship. The preservation of health in man's animal associates is, in itself, a laudable goal. Public health-wise, however, the veterinary practitioner represents the most important member of the health professions in blocking the transmission of disease from animals to man. — *James P. Dixon, Commissioner of Health, Philadelphia, Pa.*

*The Care and Breeding of Laboratory Animals, edited by Edward J. Farris, John Wiley & Son, Inc., publishers, New York, N. Y.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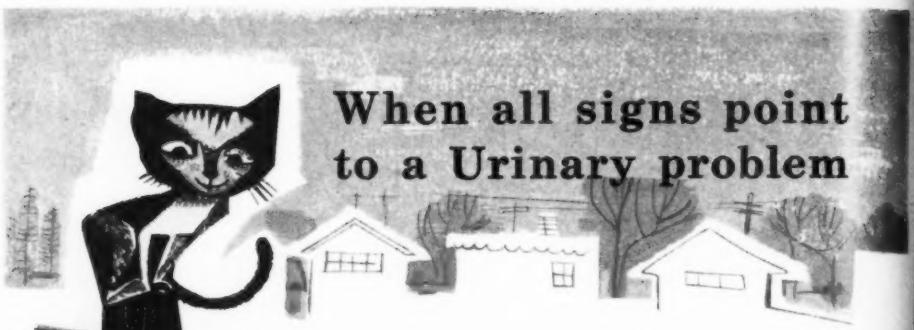

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(Continued from page 474)

thought to be due to shipping of susceptible feeder pigs or those recently vaccinated, the shipping or movement of infected animals, garbage feeding, and the improper use of simultaneous virus. Antiserum supply was exhausted during the summer months. Practitioners stood in line waiting for their allotted supply, generally insufficient to meet the demand. As an emergency measure and in an attempt to control spread and losses, the Bureau of Animal Industry released antiserum without official potency tests. It was suggested that the large swine producing states should arrange contracts or agreements with responsible serum companies requiring such companies to carry a reserve which would be deemed sufficient to meet all emergencies.

Hog flu was prevalent during 1927[18]. Hog cholera, which was so severe during 1926, took a lesser toll during this season.

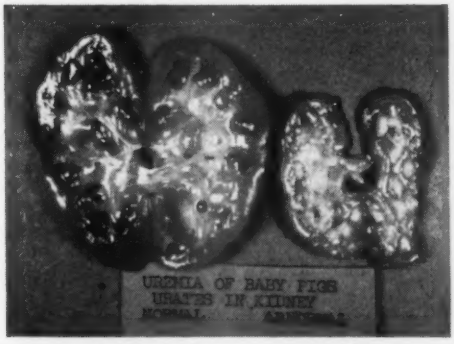
Of the diseases most important in contributing to postvaccination problems, necrotic enteritis ranked first, followed by intestinal parasitism, influenza, abortion, infectious rhinitis, pig scours, mange, and tuberculosis[18]. Under intensive study by various experiment stations were hog "flu," parasites, anemia, swine dysentery, infectious enteritis, vulvovaginitis, abortion, and a study of blood cellular elements as an aid in diagnosis.

A new condition described as edema of the lungs made its appearance in 1928. It was suggested that veterinarians make an extreme effort to determine that the animals to be vaccinated had not been subjected to devitalizing conditions; that, if the simultaneous treatment was to be administered to animals not in good health, owners should be advised of hazards that almost invariably occurred. In such instances simultaneous vaccination should be postponed until corrective measures were completed.

Mounting Losses due to Disease

Losses in swine herds in 1930 were severe because many farmers were not able to finance immunization of their herds[18]. It was evident that there were causes other than impotent antiserum and virus which accounted for most of the unsatisfactory results. Administration of serum and virus to hogs exposed to and suffering from diseases other than cholera accounted for many of the so called "serum breaks" and a large part of the death rate subsequent to vaccination. Vaccination for hog cholera by owners and handymen accounted for many deaths. Economic conditions encouraged administration of insufficient amounts of antiserum and this also accounted for some losses.

Erysipelas was responsible for considerable losses in swine herds in 1931[19] due in part to the fact that few veterinarians recognized the disease in the acute form. There was grave danger of hog cholera being obscured or otherwise overlooked where such infection was present simultaneously. It was suggested that, in cases of doubt, cholera antiserum and erysipelas antiserum be given at the same time. Possibility of spreading erysipelas by means of cholera virus was being considered for study. Losses in anemic baby pigs following vaccination was due to shock.



Uremia of baby pigs. Cross section of kidney illustration urates (r) compared with normal kidney (l).

Results of investigation by the Bureau[20] revealed that the rapid-plate and the tube agglutination tests are helpful means of diagnosis of erysipelas. Positive agglutination tests were obtained early in the acute stages of the disease as well as in chronic cases exhibiting symptoms of arthritis. These tests did not eliminate the possibility of hog cholera also being present. It was learned that both diseases may be present simultaneously.

Unrelated Loss Factors

Because of severe and unprecedented drouth conditions in 1933[21], mass movement of swine occurred. Erysipelas and enteritis were widespread in Iowa, Nebraska, and South Dakota. Spirochetes, amoeba, trichomonads, and Balantidium had been identified in cases of acute hemorrhagic enteritis. Disease spread rapidly, was readily transmissible and did not respond to any of the presently known medicinal agents. The Bureau passed a regulation that all swine that were used in the production of hog cholera antiserum be negative for brucellosis unless the serum was pasteurized. Little

swine vaccination was done due to the drouth, low prices for hogs, feed shortage, and the general economic depression.

During 1934[23] there was a shortage of feed and prices were low. This resulted in a decrease in the number of swine produced. Postvaccination losses were heavy during the fall months. Reports indicated that failure to determine the condition of the pigs before vaccination and insufficient doses of serum, and not impotency of the product were responsible. Importance of erysipelas as a cause for loss was fast approaching that of hog cholera. Steps were being taken to make erysipelas a reportable disease.

Hog cholera, enteritis, and swine erysipelas continued to be the most important transmissible diseases of swine ranking in importance in

Liver. Visceral granuloma due to Ascaris Lumbroides infection.

the order named[23]. Feed was short (1935) and the swine population was greatly reduced in number due to continuing severe drouth conditions. The losses in swine herds resulting in postvaccination aberrations was due, in part, to the lowered resistance of dietary deficiencies.

There followed (1936)[24] an increase in incidence of cholera in the Midwest. More cases of postvaccination reaction occurred. It was felt that such trouble might be eliminated to a large extent through a more careful study of herds before vaccination and the administration of ample doses of serum. Inclement weather conditions complicated problems in control of enteritis. The states of Iowa and Nebraska reported an unusual type of influenza which was complicated with extensive pneumonia and many deaths. Extension veterinarians were asked to stress the relationship to human health of certain swine diseases such as trichinosis, brucellosis, and erysipelas.

Heavy losses of swine due to enteritis were reported in 1937[25]. Parasitic and pulmonary diseases also were prevalent and were directly responsible for sizable losses in some areas. Differentiation of acute disease was faulty in many cases so that the general recommendation was proposed that in all questionable cases cholera antiserum should be administered promptly.

The Committee on Transmissible Diseases of Swine, the U. S. Livestock Sanitary Association, recommended that all agencies promote the dissemination among swine growers of the latest information relating to housing, feeding, and sanitary care of swine. This information would accomplish reduction in pulmonary, parasitic, and enteric diseases and this in turn would influence favorably serious postvaccination reactions. The McLean County system of swine sanitation was being practiced widely.

Hog cholera, swine erysipelas, enteritis, brucellosis, and Listerella infection were the diseases of swine given the most attention during 1939[27]. Swine enteritis studies were pursued vigorously to separate various etiological agent capable of causing pathological changes in the intestinal tract. It was suggested that the name necrotic enteritis be substituted for the term swine typhus because of the work done with *Sal. cholera-suis.*

New Problems from New Practice

Livestock officials and veterinarians were worried over the dissemination of diseases of swine through community sale barns in 1940[28]. Supervision of movement of livestock by railroads was being enforced; therefore, there should be supervision of transportation of swine moved over the hiways by trucks both within and between states.

In 1941[29] veterinarians and livestock officials in all states were concerned over the possible spread of swine diseases through sale barns as these sales facilities were made available in communities throughout the Midwest. There was a shortage of practitioners who were available to supervise inspection of animals consigned to these newly developed agencies. Serum and virus for immunization purposes were essential. Swine erysipelas serum and culture were being used on farms in the Corn Belt as an experiment.

The 1942 Committee on Swine Diseases (A.V.M.A.) suggested that proper attention

to sanitary measures on the part of farmers, veterinarians, sanitary officials and all others engaged in production and transportation could reduce the mortality of swine[30].

Swine population rose to the greatest figure it had been to date. Brucellosis and erysipelas became ever challenging medical problems.

Swine brucellosis was reported increasing in importance again in 1944[32]. Experimental work with this disease was beginning to take form. Some veterinarians contracted the disease from infected swine. It became a public health occupational hazard.

In 1947, the Committee on Transmissible Diseases of Swine[33] (U.S.L.S.A.) reported that in 32 states improper husbandry, including bad management, housing and sanitation was the primary cause of death losses in baby pigs. Nutritional disturbances, improper feed for the sow during gestation and lactation, pig anemia, intestinal disorders, including infectious and transmissible gastroenteritis, were among anomalies mentioned as having been responsible for considerable loss. Eperythrozoonosis was also reported as occurring in swine herds. Respiratory disease complicated by pasteurellosis, *Br. bronchisepticus* and streptococci infections were common during the year. The Committee recommended extending efforts toward differentiation of diseases and indentification of causative factors by use of diagnostic laboratory facilities.

Attention to a disease of pigs affected with a paralysis also occupied interests of practitioners during 1947[34]. Fixed tissues from animals affected with what appeared to be Teschen's disease were referred to pathologists for sectioning and examination. Microscopic lesions characterizing this European disease were not found. It was proved later to be due to an excess of minerals content of rations.

It was estimated in 1948[35] that 50 to 75% of pigs raised in the Hog Belt were vaccinated for cholera and that from 95 to 96% of these were double treated. Complicated postvaccination were frequent and puzzling.

In the fall of 1949 and again in 1950, the Bureau issued official press releases relating to the finding of a "variant" cholera virus[36]. The Bureau recommended: (1) Vaccinate pigs before they are weaned, and (2) increase the amount of serum at least 50%.

Infection with the "variant" virus referred to in the preceding paragraph was prevalent in 1950[37]. Practitioners were concerned with enteritic anamolies of various types and severity which were not differentiated. Swine dysentery (vibriosis) was reported from some areas.

In 1952, vesicular exanthema appeared in swine droves in 29 states[38]. Various outbreaks were due to the raw garbage feeding and the shipment of infected animals through central markets. Swine exposed in these markets were scattered over a wide area. The infection did not spread to farm herds. Infection was confined to public stockyards, serum plants, and a few garbage feeding establishments. Control by restricting movement, condemnation, and slaughter were applied however unwisely. The disease continued to infect new herds and reinfect replacement herds on premises previously infected. Little progress toward control was made in 1952, at which time the disease occurred in 21 states[39].

Special attention was called to the adverse effects on pigs *in utero* when sows were vaccinated with the modified live virus vaccines near breeding time and while pregnant. Some pigs developed ascites.

During 1953 one of the most important diseases affecting swine were enterotoxemia or edema disease, eperythrozoonosis, anthrax, and parakeratosis[40]. The new modified live virus vaccines which came into widespread use promptly after licensing of the product appeared to reduce the number of unfavorable vaccination sequellae reported during years immediately preceding. Dr. Richard D. Shuman made his report during 1953 that, if gilts and sows were immunized for erysipelas at or near breeding date, pigs were protected through collostral immunity until they were several weeks old. Swine erysipelas bacterin was introduced for evaluation.

Summary

Some facts revealed by research scientists and field veterinarians are chronicled in this article with the fond hope that some younger men, or perhaps older men with experience, may find interest and value in the review.

Opinions or statements in this and preceding articles of this series may appear strange and unacceptable. They are personal interpretations of developments. Certain prejudices and misinterpretations may have occurred in the recounting of associations with developments with which they were initially revealed, but effort has been made to be objective in consideration of many factors which have influenced progress.

It is unfortunate that some shadows of the old "trade secret" philosophy still linger in the

field of veterinary medicine. Generally the doors have been opened freely, providing the best stimulus to advancement. The veterinary profession is growing and developing with distribution of information pertaining to its new accomplishments. Restriction of information can only retard progress. Growth of individual skills came only by free exchange. In the disclosure of information, it is neither necessary nor desirable to reveal every last detail. The objective should be to provide sufficient information to stimulate thought and ideas for advancement in all work. Certainly there are many aspects of competition in the veterinary field that more general release of certain basic information can still leave a large area in which individuals can exercise ingenuity, enterprise, and initiative. In the field of veterinary science, all published information should be based on facts and not drawn from opinions.

In retrospect medical advancement in the field of swine practice has been rapid. Surer progress is promised for the future because of the broadened base of information.

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▼ ▼ ▼

Ancient Use of Quarantine

In 1348, a Sanitary Council was formed in Venice, crossroads of the world of commerce in the 14th century, and given facilities together with power to hold and isolate ships, people, and property. The system grew because devastating epidemics exacted a high price in human life for commercial supremacy. A safe period was considered 40 (quaranta Italian) days, a fact which led to the term "quarantine."

▼ ▼ ▼

Training and Skills of Veterinarians Indispensable to Public Health

A well-trained, active veterinary profession is essential to any good public health program. With our increase of knowledge in the field of ecology it grows more and more important. Even the trend of present world politics enhances the value of the veterinary profession to our food conomy, for the simple reason that the most likely attack with biological warfare agents might be directed against our food animal population, rather than against our human population. Thus your field of usefulness becomes even greater, with a constantly widening horizon for service needed toward a better public health.—*Henry A. Holle, Texas Commissioner of Health.*

Abnormal Shape of the Heart of Dwarf Cattle†

D. F. EVELETH,* Ph.D., D.V.M., F. M. BOLIN,* D.V.M., and M. L. BUCHANAN,** M. S.
Fargo, North Dakota

Dwarfism in cattle has become a serious economic problem because of death losses of calves and failure of normal growth of the surviving dwarfs.

Various bone deformations in dwarf cattle have been described and the literature summarized[1].

It has been observed that in many cases of dwarfism there is also an abnormality in the shape of the heart that simulates the "beri beri" heart in man[2, 3] and to some extent the hypertrophied heart of cattle with brisket disease[4].

Data obtained on glucose tolerance tests of dwarf cattle indicate that these animals cannot utilize glucose in the same manner as normal cattle. The blood glucose content, after glucose injection into the jugular vein, indicates that the "snorter" dwarf is diabetic.

Various reports suggest that in human diabetics, the offspring of a diabetic mother may show hypertrophy of the heart. The term "beri beri heart" has been used to describe this type of heart, although there is no basis for a conclusion that a deficiency in any of the vitamin B complex is the cause of the changes in the shape of the heart.

Shown in figure 1 is a supposedly normal heart and a heart from a dwarf; the dwarf heart is almost spheroid in shape while the normal heart is typical of the classical shape described for the bovine heart.

The significance of the abnormal heart may be of importance in several ways. Many dwarf calves, born normally or by cesarian section, die within 20 minutes after birth. The cause of their deaths has not been determined.

The study of dwarfism in cattle at this experiment station is directed at genetics and physiology, but various anatomical variations of dwarfs have been observed and recorded. The so-called "beri beri" heart appears to be a part of the general picture of dwarfism.

The authors thank John Gillam*, M.D., for his interest and help in this phase of the investigation of dwarfism in cattle.

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▼ ▼ ▼

A group of scientists including Dr. Fred D. Maurer of the Armed Forces Institute of Pathology, Dr. Donald E. De Tracy and Dr. K. L. Kuttler of the USDA, and Alfred M. Webb of the Department of the Army Chemical Corps have been awarded patent on a new rinderpest vaccine. The product is prepared of virus material rendered noninfective by chemical means. Patent rights were assigned to the United States as represented by the Secretary of the Army.—*S.N.L., 8/4/56.*

†Published with the approval of the director, North Dakota Agricultural Experiment Station, Fargo.

*Departments of Veterinary Science and **Animal Husbandry.

*Dr. John Gillam, Obstetrician, Fargo Clinic, Fargo, North Dakota.

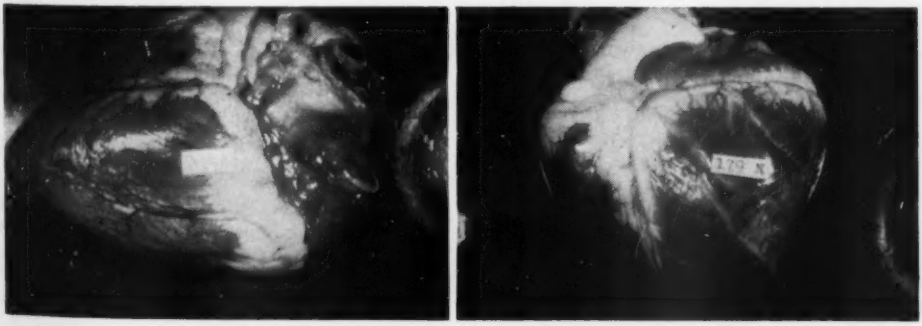

Fig. 1. Heart of normal calf (left), dwarf (right).

An Outbreak of Psittacosis in Turkeys†

F. R. BEAUDETTE,* D.V.M., D.Sc., C. B. HUDSON,* B.S., M.S., and V. R. KASCHULA,* D.V.S.,
New Brunswick, New Jersey.

The owner of the farm in Dutch Neck, Mercer County, New Jersey, on which an outbreak of psittacosis occurred has been rearing turkeys for about 30 years. Replacement stock had always been produced on the farm until about 15 years ago, when the owner started bringing in stock from California. Fowl typhoid appeared in the young stock that year and reappeared each year for the next five or six years.

For the past 15 years poults have been purchased from one or more sources, grown, and marketed, so that for a part of the year the farm has had no turkeys. A flock of chickens on the farm had no direct contact with the turkeys. Each year the poults have been brooded in colony houses and then put on range at nine to ten weeks of age, that is, between July 4 and 10. Thereafter, the young turkeys were without shelter. Each year the colony houses are moved to new ground.

The 1954 population in which the outbreak occurred was made up of poults obtained from five sources. One lot of 750 was purchased from a hatchery in Cranbury, New Jersey. The eggs that produced this lot, however, were thought to have come from Oregon. A second lot of 250 poults came from Ephrata, Pennsylvania, and was probably produced by breeders there. A third lot of 500 poults was purchased from Blackwood, New Jersey, and was probably hatched from eggs originating in Texas. A fourth lot of 500 poults was purchased from Allentown, Pennsylvania, and was probably hatched from local breeders. The fifth and final lot of 250 poults came from Englishtown, New Jersey, but was actually hatched in a commercial hatchery in New Brunswick from eggs presumably produced in Englishtown.

The five lots of poults were purchased between April 26 and May 10. The owner always tries to maintain an age interval of about three weeks between the youngest and oldest poults. The poults are brooded in lots of 250 to a house and those from different sources are kept separate during the brooding season. After the birds are put on range at eight to ten weeks of age, however, they intermingle and it is no longer possible to identify those of a given source.

There had been no unusual losses during the brooding period, in fact, the losses were so unusually low that more than 2,100 birds were put on range. The flock was vaccinated with pigeon pox vaccine about September 1, that is, at about four months of age.

The first evidence of disease appeared about the end of the third week in October. There were mild respiratory symptoms but the most striking symptom was a diarrhea in which the droppings were sulfur-yellow and of an unusually disagreeable odor. According to the owner this odor persisted on the range even after the flock was disposed of by slaughter. The disease appeared to affect only a part of the flock. Those which perished did so after an illness of five to six days; total mortality was said to be 50 to 60 birds. An observation emphasized by the owner was that rigor mortis was complete within a half hour after death. It should also be mentioned that a sulfonamide had been given from the onset of illness.

Four dead birds were presented to us on November 2, 1954, by a serviceman. Autopsy revealed necrosis of the liver and spleen, congestion of the lungs, and hemorrhages in the skeletal muscles which may or may not have been a characteristic of the specific infection. The air sacs also showed evidence of infection and because of the absence of sinusitis it was decided to make egg inoculations. Liver smears on beef extract agar plates remained free of bacterial growth.

A portion of spleen from one turkey was suspended in broth and treated with streptomycin (20 mg. per cc.) and inoculated by way of the yolk sac in a dose of 0.2 cc. per egg. Six-day-old embryonating eggs were employed. Of the six embryos inoculated, one died on the third day, one on the fourth, three on the fifth, and the last on the sixth day of incubation. On harvest, all were found to be reddened, their livers swollen, and the yolk sac vessels highly congested. Smears of each embryo on agar plates remained sterile.

Smears of each yolk sac were made for microscopic examination. One of these was stained with Giemsa and the others with Macchiavello, and in each case typical LCL bodies of psittacosis were found. Finally, our diag-

(Continued on page 500)

†Paper of the Journal Series, New Jersey Agricultural Experiment Station, Rutgers University, The State University of New Jersey, Department of Animal Pathology.

*New Jersey Agricultural Experiment Station.

EDITORIAL COMMENTS

Insurance for Veterinarians — A Decade of Experience

In 1946, the Executive Board of the Illinois State Veterinary Association negotiated with Insurance Broker Peter N. Jans of Evanston, Ill. regarding insurance against time loss for its members who become disabled because of accidents or illness. The first policies were made available to 104 of 122 applicants. During the past decade, several major changes have been made in the original contracts, all favoring the insured. These were made after consummation of exhaustive study and experience, and were designed to meet the needs of professional men whose income was dependent on their ability to practice.

During the first two years after the first contracts were issued enrollment increased significantly. The claim loss-ratio during 1946 and 1947 would have discouraged any but the most experienced underwriters.

Claim loss-ratio was "cured" substantially as enrollment increased. The increase was aided by participation of Indiana veterinarians in the original plan.

In 1948, those policies held by insured veterinarians in Illinois and Indiana were converted to the Silent Partner Plan. These new policies provided advantages in that the same benefit coverage was made available to veterinarians at the same rate then available to physicians, lawyers, and other professions embraced in the professional group insurance plan. The next important step in this pioneering program was reclassification of veterinarians — removing them from extra hazardous classifications indicated by initial risk evaluation. By this time a sufficient number of veterinarians were insured to make possible evaluation of risks in this new field. Also at that time, Broker Peter Jans performed the necessary insurance research to confirm a survey of loss-ratio, results of which were received favorably by Continental Casualty Company, underwriters. As a result, veterinarians representing professional organizations in the states of Kentucky, Texas, Oklahoma, Kansas, Missouri, Iowa, Colorado, Oregon, and Minnesota adopted and sponsored the Silent Partner Plan. Today, 23 state veterinary medical associations have selected Continental Casualty Company to insure their members, and applications from three additional states are in process.

Benefit Payments in Illinois

Evidence of value of disability to Illinois veterinarians is referred to in communication from Dr. Paul S. Dodd, Danville, Ill. As Chairman of the Illinois Committee on Insurance, he states that claims "were all settled without equivocation and some are yet receiving monthly checks." Records of ten cases in that state reveal that payments have been made ranging from $5,232.32 to $11,629.98 and totaling $76,220.85 have been paid members, many of whom have expressed satisfaction and gratitude. Obviously if such claims are to be met in a number of states simultaneously and continuously only a financially strong, experienced and reliable underwriter can be expected to function properly.

No less than six major improvements have been made in this insurance contract now offered as the D.V.M. Silent Partner Plan during the past ten years; the latest providing worldwide protection.

The National Committee on Insurance

A National Committee for members of the veterinary profession (not affiliated with the A.V.M.A.) was created in 1949 to act as trustee for the several state associations on all insurance matters referred to it by participants. By this means company cancellation of any single state or group of states is prevented. Some accomplishment for benefit has resulted from National Committee action notably the acceptance by Continental Casualty Company of proposal that all active members of state associations under age of 70 be granted the special rate originally set up for graduating students and faculty members of veterinary colleges.

Summary

Today, every insured veterinarian under the Silent Partner Plan enjoys complete coverage with only four exceptions: War, suicide, military service, and private flying.

Sickness disabilities are covered irrespective of the date of the origin of such disability.

There is no limit to the number of claims

that may be filed by the insured during the life of his policy.

No individual state-wide cancellation will occur unless the profession as a whole is cancelled, except for failure to pay premium, retirement, reaching age 70, or dropping membership in the state association.

The accomplishments cited in the foregoing were possible in part because the smallest fraction of the premium dollar has been expended to put the business on the books and for management and operation.

Continental Casualty Company, insurers, have pioneered in professional groups insurance. The first such group has been covered for over 30 years (1923).

Veterinarians in every state of the nation are encouraged to examine the D.V.M. Silent Partner Plan contract, inquire into validity of facts stated in the foregoing, and investigate financial responsibility and business integrity of the underwriters.

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Postal Deficit a Shadow Monster

The shock troops of futility earned another battle star in a familiar campaign theatre a few weeks ago — the hearing rooms of the Senate Post Office Sub-committee. The campaign was the time-honored hackneyed pressure drive to push past the Committee onto the floor of Congress itself legislation intended to impose ruinous postal rates on publishers entering second class matter in the United States mails. The campaigners themselves — the good, gray suited frontline fighters for so-called economy — presented their traditional shibboleth, which has heretofore remained unchallenged, that second class magazines were saddling the Post Office with a money losing obligation. This Post Office traffic, the assertion goes on, was in fact a subsidy to publishers.

One of the nation's leading picture magazines threw reserves into the fight that may send this pet canard to the briny bottom of an ocean of misinformation. *Life* magazine introduced testimony which indicated that the Post Office subsidy to the magazine was a myth, that in fact the government's postal system reaped a handsome $8,000,000. to $10,000,000. profit annually for carrying the magazine. If the *Life* testimony stands up, and there seems to be little doubt that it will, its introduction may make the expected fight next year take on a new flavor.

Printers Ink, an advertising trade paper weekly, however suggests that due to the atmosphere of intimidation under which postal rate discussions commonly proceed, the *Life* fact-finding study may have little if any effect at all. "Rate hearings and other discussions are so impregnated with the idea that the Post Office operates at a deficit which must be made up by mail users (except for some exempted) that such testimony is not apt to have much effect."

Far from being consumed with apathy, we wonder about the so-called losses which under proper bookkeeping methods may well prove to be phantasmagorial monsters operating on a borrowed shadow of illusion. From time immemorial, the Post Office has been used as an instrument with which to subsidize railroads, airlines, congressmen, and other branches of government. Anyone in his 20's can recall a time when this branch of the government was used to give local economy shots in the arm to low employment regions, as well as acting as a booster station to education by carrying books at reduced rates, and a morale booster by giving the franking privilege to soldiers.

In a world that moves faster than ever before, we question the feasibility of making a multi-billion dollar business the parking spot for political appointees, both in the job of Postmaster General and Postmastership of every basic community in the country. We look with disdain on the implausibility of this business operating with antiquated equipment, and without any attempt at pungent ridicule we honestly inquire whether the best business practices are being pursued with attention to economy of operation.

We doubt that the advocates of "making the Post Office pay" really mean what they say. Their idea seems to be to put publishers on the defensive and to percolate through to the public a false, implausible and invalid idea on the nature of second class traffic. We question that anyone in the country really wants to put educational development and public information on a paying basis at the risk of ignorance and misinformation, any more than a city's sanitary system must pay its way if the alternative is disease and misery.

There is a place in all this for the clean white light of common sense. Perhaps the next time the subject entertains the congressional committees, we might hear what educators and civic leaders have to say about this arrant nonsense. Let's end the fencing match and demolish, with the facts of life, the embalmed theories that march with the gait of the un-dead.—*Charles Walters, Jr., B.Sc., M.A.*

A.V.M.A. San Antonio Meeting

The local Committee at San Antonio, Texas headed by Dr. A. R. Rees Jr., general chairman, has completed all plans for reception of delegates and visitors to the 93rd annual meeting of the American Veterinary Medical Association.

Executive and legislative sessions will convene during the week prior to the official opening culminating in sessions of the House of Representatives on Saturday, October 13. Over 30 group conferences and meetings are scheduled beginning October 13. These will be held at designated hotels. Those interested in special conferences must consult programs that will be made available at registration. President Dean Floyd Cross will call the opening session to convene at 9:30 a.m. Monday, October 15 in the Main Arena of the Auditorium which will adjourn by noon. Thereafter sectional meetings are scheduled through Wednesday afternoon. A general and closing session will conclude deliberation in San Antonio. An adjourned session will be held at the new National School of Veterinary Medicine, University of Mexico, University City, on October 20.

President Floyd Cross, dean of the School of Veterinary Medicine, Colorado A. and M. College, Ft. Collins will preside at this meeting, at the conclusion of which he will retire in favor and on installation of President-Elect Brig. Gen. Wayne O. Kester.

Entertainment features planned for this year are particularly ambitious. A preconvention trip to the famous King Ranch and the already mentioned trip to Mexico will be both educational and entertaining. Side trips to a number of favorite recreational points have been arranged. Besides these pre- and postconvention activities, a golf tournament at the Fort Sam Houston Golf Course is scheduled for all golfers (four divisions) on Tuesday afternoon, October 16. The President's Night chuckwagon barbecue will be held the same evening. On Wednesday October 17, Alumni Dinners will afford opportunity again this year to renew acquaintances with classmates.

Visitors to Texas are assured comfortable quarters, an expertly arranged program, and an abundance of Texas hospitality.

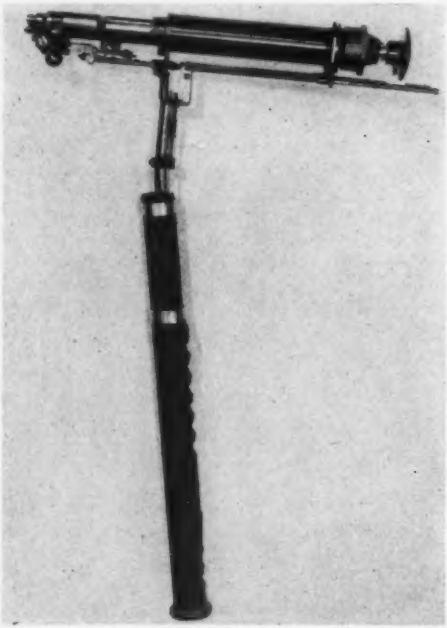
President Floyd Cross

San Antonio Texas. Skyline of the Convention City backed by miles of home set upon the hillsides stretched to the north, east and west along the lovely river valley to the south.

Humane Slaughter

A new powder-actuated instrument that promises to assure the humane slaughter of livestock will soon be placed on the market by Remington Arms Company, Inc., and already has received an enthusiastic reception from meat packers and animals protective organizations.

The tool, named the Remington Humane Animal Stunner, renders cattle insensible to fear and pain prior to processing in meat packing plants. The meat industry claims the stunner is not only humane but offers vast improvements to methods that have been in use for many years.



The stunning instrument is actuated by a 22-caliber blank cartridge specially designed for the purpose. Similar to a polo mallet in appearance, the tool is tapped lightly against the animal's forehead, and a protruding trigger mechanism fires the charge. A mushroom-shaped head, mounted on a captive piston, is sent forward by expanding gases and stuns the animal instantly without needless injury.

The MSPCA has awarded a silver plaque to Remington Arms for its achievement, and the American Society for the Prevention of Cruelty to Animals has presented the company with its $5,000. James Hopkins Award for meritorious research into the field of humane food animal slaughter.

Remington Arms spent a large sum in developing and testing the instrument over the past year. Remington sales and engineering personnel carried their studies to the floors of the nation's slaughtering plants to be certain that the tool integrated smoothly with all other operations. Studies were made of methods by which animals are handled and of animal physiological response in order to eliminate terror.

The results with the Remington Arms instrument, according to a joint statement of the American Meat Institute and the American Humane Associaion, "have been extremely encouraging, both to the meat industry and to humane interests."

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An Outbreak of Psittacosis in Turkeys

(Continued from page 496)

nosis was confirmed by Dr. K. F. Meyer to whom we sent livers of embryos dead on the fifth and sixth days of incubation.

The diagnosis was reported to the State of New Jersey Department of Health, and Dr. Oscar Sussman, who supervised the disposal of the flock, issued a memorandum to veterinarians in the state under date of January 11, 1955. In this it is recorded that serum samples from nine persons in contact with the flock gave positive results and that seven of them had clinical evidence of psittacosis.

The owner is convinced that prior to 1954 his birds had never experienced this disease. In fact, the 1955 crop was grown and marketed without unusual losses except for those in one lot during the brooding period. This lot of 750 came from the same Cranbury source as in 1954, and 250 of them died within a few days after reaching the age of ten days. On the basis of autopsy findings in two laboratories, a diagnosis of chronic respiratory disease was made. In one laboratory an attempt was made to recover the psittacosis agent but with negative results. Moreover, an injection of 50 mg. of streptomycin in 0.5 cc. per bird, although producing a severe reaction, appeared to stop the losses. Other lots of poults — 1,000 from a source in Massachusetts, 500 from the Allentown, Pennsylvania supplier, and 250 from Sergeantsville, New Jersey—suffered no unusual losses during the brooding period. After being placed on the range there was no repetition of the 1954 episode.

Television Shows to Feature Veterinarians

Jack Webb of Dragnet fame and his Mark VII, Ltd. motion picture producers have launched a television series based on experiences of veterinary practitioners. The cooperation of the Southern California Veterinary Medical Association was solicited and extended through a committee of that organization. Dr. C. L. Miller, Committee member, reported that the National Broadcasting Company will feature the series beginning Tuesday, September 18, and weekly thereafter, sponsored by the Liggett & Myers Tobacco Company.

The first production has been previewed by members of the S.C.V.M.A. The film titled Noah's Ark pleased viewers for its portrayal of the veterinarian and his practice as authentic and accurate. Public relations value of this effort has tremendous potential if handled properly. From the producer's standpoint value of humane service to animals has strong audience appeal which promises success for the series. From the profession's standpoint it appears as first-rate opportunity to render eminent service by demonstrating with accuracy the functions and duties of private practitioners and the service rendered in their respective communities. The television shows will serve to fulfill the prerequisites of the classical feature of public relations (not publicity) technics, *i. e.*, tell the story of the profession's work and responsibilities in the sense of its benefits to the public.

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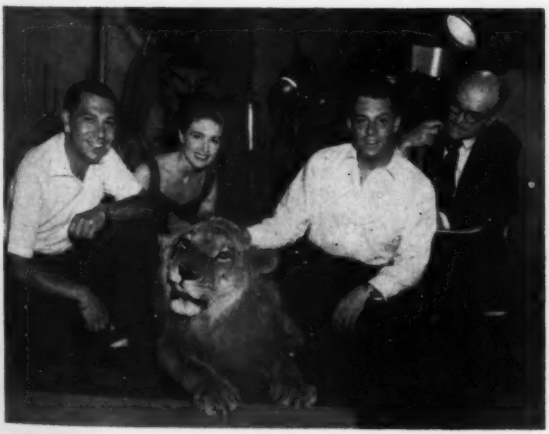
A dramatic scene unfolds in the doctor's office. May Wynn as Elizabeth Clark, the doctor's receptionist, and Paul Burke, in the title role of Dr. Noah McCann.

Hemorrhagic Disease of Poultry

Although no bacterial or viral agent has been identified associated with the typical hemorrhagic syndrome in broilers, many veterinarians feel there is a difference in the condition as observed in the field and *avitaminosis K*. Other observations point to the addition to rations of certain coccidialstats.



On the set of The Friendly Lion episode of the new TV series, Noah's Ark, which is based on practitioners' experiences, are (l. to r.), producer Jack Webb, May Wynn, Jackie the Lion, who plays the role of King Arthur, Paul Burke, and Victor Rodman.

Legislative Action Relating to Poultry Inspection

A number of bills were introduced in the 84th Congress calling for mandatory federal inspection of poultry for wholesomeness. Three different subcommittees held hearings.

Public Health officers and agencies, veterinarians, farm organizations, even labor unions have urged passage of suitable legislation to guard consumers against unwholesome poultry products and to protect the public health. These and others, including Department of Agriculture officials, agree that poultry farmers and processors would be assisted by compulsory inspection because of increased consumer confidence in the products offered for sale. The failure of the 84th Congress to prepare adequate protective legislation and pass it into law is not consistent with previous congressional action making possible high F.D.A. standards.

In a report of the Senate Committee on Labor and Public Welfare (document 129) the Committee found unanimous agreement that compulsory poultry inspection should be instituted. Conflicting testimony and opposition lead to confusion about who should be responsible. Consumer groups and state health and food and drug officials have strongly opposed placing the inspection in a marketing agency such as the Poultry Branch, particularly in view of the agency's misdirected and questionable administration of voluntary poultry inspection in the past, and its continuing subversion of protection for the consuming public. No organization is better equipped to perform this service than the Meat Inspection Branch of the Agriculture Research Service. This agency not only has a record of 50 years of service in inspection of meat food but has earned an enviable reputation as a consumer protective agency.

The denial of effective legislation is certain to result in attention being drawn more emphatically and publicity given to cases of diseased poultry reaching market channels. These will tend to reduce acceptance of poultry by the housewife and influence demand unfavorably. It is inevitable that repeated efforts will be made to get a satisfactory law passed at the next session of Congress. Those interested in this vital matter should make their wishes known to their Congressmen, and to the Senate and House Committee on Agriculture, between now and the time the next Congress convenes.

Meat Inspection Statistics

Postmortem inspection of meat food animals for fiscal year 1955 is reported as summary of activities of the Meat Inspection Branch, USDA.

TABLE 1. USDA Meat Inspection

Animal	Passed	Condemned	Total
Cattle	18,643,780	81,675	18,725,455
Calves	7,563,234	37,801	7,601,035
Sheep	14,432,021	56,691	14,488,712
Goats	86,205	454	86,659
Swine	56,951,433	104,005	57,055,438
Horses	236,424	1,038	237,462
TOTAL	97,913,097	281,664	98,194,761

Pleurisy or pneumonia was ranking cause of condemnation of cattle, followed successively by abscesses or pyemia, emaciation, pericorditis, septicemia, and enteritis. Arthritis was the cause of condemnation of the largest number of swine.

Vaccination Stifles Near Epidemic

Concern of Chicagoans a few weeks ago regarding the near epidemic proportions of poliomyelitis has been ameliorated by a successful vaccination campaign.

The Chicago story is a saga of what might be considered one of the greatest disease fighting efforts in modern medical history. Incidence of poliomyelitis in that city increased sharply early in July and continued to attack greater numbers each week until August 9. Twice a gradual decline is reported by Doctor Bundesen, of the Chicago Board of Health.

A mass vaccination program was instituted making inoculations with Salk vaccine available free of charge to youngsters six months through 19 years of age and pregnant women, in 61 area hospitals, 48 health department clinics and other private health centers. A total of 300,000 inoculations were made during the period.

Remarkable success appears to have attended the fine example of these cooperative disease control efforts. Evidence of the efficacy of the vaccine was also noted in the statement that no case of paralytic poliomyelitis developed among any of this year's 971 Chicago victims of the disease who received full protection.

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From the standpoint of differential diagnosis of one group of poultry diseases it is well to remember that facial edema and edema of the wattles are observed in coryza, but not in chronic respiratory diseases.

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

Meat Preservation by Antibiotic Treatment

Spoilage of meat occurs as a result of bacterial contamination. It has now been demonstrated that spoilage may be delayed if, in addition to the usual refrigeration, the beef carcass is sprayed with and also receives a minute amount of an antibiotic intravenously. Dressed poultry carcasses are dipped in the antibiotic solution, and by this means the yet to be refrigerated carcasses remained unspoiled for 29 days as compared with eight days for the treated. Ground beef stayed fresh for nine days as compared with five days when not antibiotic treated. Cooking destroys the small amount of antibiotic used. This method of treating meat food products has not been approved officially by the Food and Drug Administration.

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Determination of Dwarfism

An interesting preliminary report from both Columbia University, and Western Reserve regarding dwarfism indicates that the nucleic acid content of certain body tissues varies as follows: (a) The tissues of dwarfs are low in nucleic acid, (b) the tissues of carriers are subnormal in nucleic acid, and (c) the tissues of clean animals, that is free from taint, have nucleic acid in normal or high amounts. These extensive studies on dwarfism were performed on mice and a few beef cattle. All of this could mean, after more thorough evaluation of the project, that a prospective buyer of a high priced animal might ask for a biopsy and nucleic acid determination.

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During the warmer season of the year several of the various abnormal skin conditions in long-haired dogs are doubtless due to or at least a sequel of a fatty acid deficiency due to low intake or systemic destructive processes in the tissues. At any rate, it is a manifestation of the correctness of this theory when affected dogs improve following the moderate addition of vegetable cooking oils or fresh animal fats to the ration. A precaution to observe is to avoid digestive upsets by the addition of excessive fats in the ration.

Influence of Milking-Out on Milk Fever

In spite of quite a general opinion to the contrary, tests conducted at several experiment stations seem to indicate that the incidence of milk fever of cows is as great in those incompletely milked out for a few days following parturition as in those completely milked out from the time of calving. The older theory was based on general observations that milk fever was rare in those cows nursing their calves for a few days after the latters birth, and that the nursing calves never removed, at least not after each nursing, all the milk.

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Antibiotic for Actinomycosis

The use of penicillin in the early stages of actinomycosis, especially the inoperable form involving the bony mandible, is followed by satisfactory clinical results in most cases. A mature animal may receive doses as great as 3,000,000 units daily. In some instances, the condition clears up when a total of 12,000,000 units has been given. If the owner does not object to the expense, the daily injections of 3,000,000 units may be continued for as long as three weeks. When the soft tissue is involved, the standard treatment is still surgery and the intravenous injection of 30 gm. iodide of soda dissolved in 500 ml. of water. Repeat in three weeks if necessary.

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In the *Onderstepoort Journal of Veterinary Research* for December 1952, it is reported by Weiss, Haig, and Alexander that "The value of aureomycin in the treatment of heartwater has been established." Dosage used was 2.5 mg. per lb. for sheep in a single dose, or in divided doses at 24-hour intervals. Cattle responded to doses of from 2 to 2.5 mg. per lb. The agent was administered intravenously. Heartwater is an otherwise fatal disease of cattle, sheep, and goats in South Africa. In general, it is characterized by fluid accumulation in the pericardium and pleural cavity. It is due to *Rickettsia ruminantium* transmitted by the tick, *Amblyomma hebraeum*.

POULTRY PRACTICE PROBLEMS

W. R. HINSHAW, D.V.M., Ph.D.
Frederick, Maryland

Influence of Temperature on Egg Laying

Egg production is highest from hens kept at a temperature of 55F. and at 70% relative humidity, according to a release from the Agriculture Research Service. Temperatures between 40F. and 70F. were generally satisfactory but below or above these limits egg laying declines. At 95F., birds exhibited distress and egg production practically ceased.

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Respiratory Diseases Most Important

In a discussion on respiratory diseases of poultry given at the January 1956, University of Pennsylvania Conference of Veterinarians, Dr. P. H. Seitz rates this group of diseases as the number one poultry disease problem. Reminiscing, he recalls the time when most respiratory diseases were classified as "colds" or "roup" as contrasted to the dozen or more specific entities now known to produce respiratory symptoms. Examples given are vitamin A deficiency, fowl coryza, localized fowl cholera, and pullorum disease, aspergillosis, gape worms *(Syngamus trachealis)*, fowl pox, infectitious bronchitis, infectious laryngotracheitis, Newcastle disease, and chronic respiratory disease (CRD). He emphasizes the need for careful differential diagnostic procedures to adequately diagnose these if proper advice for prevention and control is to be given. A brief review of the diseases is presented in the published paper (U. of Pa. *Vet. Ext. Quarterly*, 142:74 [Apr. 6], 1956). Available treatment and vaccination procedures are discussed.

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A practical method for disposal of dead birds on a poultry farm is a properly constructed disposal pit such as the one described on page 424 of VETERINARY MEDICINE, Vol. 45, October, 1950.

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The University of Massachusetts urges poultrymen to provide a minimum of one nest for every five layers.

Honor Doctor Stafseth

Dr. H. J. Stafseth, recently retired as head of the Department of Microbiology, Michigan State University and a pioneer research worker in the field of poultry diseases, was honored at the 45th annual meeting of Poultry Science Association held at Raleigh, North Carolina August 6-10, 1956, by being elected a Fellow in the Association. This is one of the highest honors granted by the Association with the total number of Fellows limited to a maximum of 5% of active membership.

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Parthenogenetic Turkey Poults

Parthenogenesis as used here is a modification of sexual reproduction in which the embryo develops in infertile eggs laid by turkey females that have never been associated with turkey males. In *Agriculture Research* (4:3 [June], 1956) a further progress report on the research of M. W. Olsen and S. J. Marsden is given. During the 1956 season two parthenogenetic poults hatched and survived for 22 and 18 days respectively. These are the first poults to hatch from infertile eggs and live more than a few hours. Previous references to research being done on parthenogenesis in turkeys by the U. S. Department of Agriculture, Agricultural Research Service (ARS) have been made in VETERINARY MEDICINE as follows: 49:258 (June), 1954; 50:45 (June), 1955, and 50:XXXIII (April), 1955.

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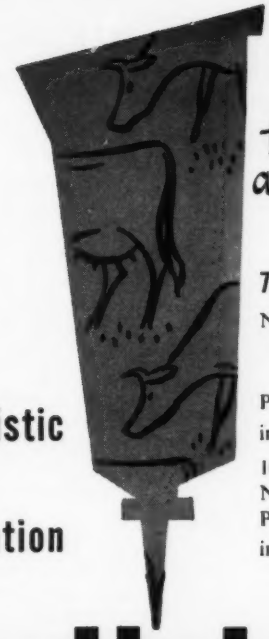
Aerosol Vaccination for Fowl Pox

A spray technic for vaccinating young chickens with pigeon pox vaccine and a discussion of sprayers for applications is presented by Dr. Tevis Goldhaft (Jour. Am. Vet. Med. Assn., 128:596 [June 15], 1956). The author advocates his technic for developing short-duration immunity needed to protect broilers exposed to fowl pox virus. According to Goldhaft, day-old chicks can be vaccinated with a pigeon pox vaccine having a titer of 1-100,000 by the aerosol methods without producing severe reactions and set-backs observed when fowl pox vaccine is used. Chicks so vaccinated are immune to exposure to fowl pox virus for a minimum of 12 weeks.



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A synergistic antibiotic combination

7.5 cc. tube contains:

Neomycin sulfate . . . . . 100 mg.
(equivalent to 60 mg. standard neomycin base)

Polymyxin B sulfate . . . 100,000 Units

in a free-flowing milk miscible base.

100 cc. multi-dose vials, each 10 cc. contains:
Neomycin sulfate . . . . . 100 mg.
Polymyxin B sulfate . . . 100,000 Units
in a free-flowing milk miscible base

Daribiotic*

Neomycin—Polymyxin B, Massengill

for intestinal and uterine infections

Each green oblong tablet contains:

Neomycin sulfate. . . . . 25 mg.
(equivalent to 15 mg. standard neomycin base)

Polymyxin B sulfate . . . . . 25,000 Units

conveniently packaged for dispensing in plio-film strips.

Twenty-four individually sealed tablets per carton.

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VETERINARY NUTRITION

MORRIS ERDHEIM, D.V.M.
Chicago, Illinois

Amino Acid Balance in Poultry and Pig Feeds

Results of studies[1] at the University of Arkansas indicate that the chick is sensitive to the lysine-methionine balance in its diet. The most effective ratio is 2:1. The addition of methionine in the absence of lysine was not beneficial. In all cases, when a response was obtained from the addition of methionine to a diet, the lysine-methionine ratio of the feed was wider than 2:1. Thus, the additional methionine brought the ratio closer to the more effective 2:1, and elicted a response. This work may help explain, in part, apparent disagreements reported in the literature concerning the advantage of adding methionine to broiler rations.

Nutritionists have been mindful of the methionine needs in feeds, so they have been using methionine-rich ingredients. Many of these normally added for their methionine content (fish or meat meal), contain lysine-methionine ratios wider than 2:1. Adding methionine, *per se*, to such feed will help narrow the ratio, thus improving efficiency of the feed. Adding methionine to a feed having a 2:1 lysine-methionine ratio will probably not be beneficial.

In a study of pigs, the Arkansas workers found that pigs too were sensitive to amino acid imbalance. The basal diet used was made up of corn, cottonseed meal, fish solubles, vitamins, and minerals. DL lysine hydrochloride was added at various levels. The optimum results in average daily gain and feed efficiency were observed when the amino acid was added at the 0.1% level. The addition of more or less than this resulted in a marked drop in daily gains and feed efficiency.

Lysine is not available in a commercial feed grade form. To supply this amino acid to a diet, feed ingredients high in lysine (fish or meat meal) are used. When ingredients low in lysine (cottonseed oil meal) are used, the deficiency is made up by including fish or meat meal in the diet, too. Lysine is one of the limiting factors in the use of cottonseed oil meal in poultry and pig feeds.

[1]Stephenson, E. L., Are We Feeding a Balanced Diet to Swine and Poultry? *Feed Age*, 6:8 (Aug.), 1956.

Conference on Labeling of Medicated Feeds

The American Feed Manufacturers Association reports (General Circular R-12; July 17, 1956) on a meeting held in Washington, D. C. to revise and simplify the regulations for medicated feed labeling. The meeting was attended by representatives of the feed industry, control officials representing eight states, and the Association of American Feed Control Officials, and representatives of the Food and Drug Administration.

Two general categories of medicated feeds were listed:

1. Products which are intended to provide the nutritive requirements when fed to an animal over an extended period as the sole ration, to which have been added drug ingredients for the prevention of various types of animal diseases. Feeds in this classification are purchased by the farmer primarily for the purpose of preventing disease. An illustration of this category would be a feed containing a coccidiostat or anthelmintic for low level, continuous feeding.

2. Products which are to be fed for a temporary period containing drugs at treatment levels or to control outbreaks of specific disease. This classification would include high level antibiotic or arsenical feeds.

Simplified label forms for both groups have been suggested. In general, these give more prominence to the manufacturer's brand name than is true on the present labels. The active drugs and their percentage in the feed continue to be prominently displayed.

It is expected that the new labels will be generally accepted and in use by January 1, 1957.

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Prevention of Traumatic Gastritis

The long list of devices designed to prevent traumatic gastritis in cattle is now joined by a new one. A patent was recently issued for a nose ring to which a magnet is attached. As the animal grazes, the magnet attracts all metallic objects. The hired man will now have an additional chore; removing the metallic objects from the magnets.

more and more veterinarians find that the

soothing, protecting healing influence *of*

DESITIN® ointment

Jars of 1 lb.

Tubes of 1 oz., 2 oz., 4 oz.

is **persistent** *in*

wounds (especially slow healing)
burns • ulcers (external)
postpartum perineal tears
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... because DESITIN OINTMENT adheres longer to the skin areas being treated ... does not liquefy or crumble at body temperature, nor is it decomposed by secretions, exudate, perspiration, urine or excrement.

DESITIN OINTMENT, rich in cod liver oil, eases pain, itch and irritation, eliminates necrotic debris, accelerates smooth tissue repair in many kinds of tissue injuries ... without sensitization or irritation.

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Classified Advertisements

Twenty-five words or less, $3.50—minimum charge; additional words, 10 cents each. Replies sent care VETERINARY MEDICINE. 50 cents additional to cover forwarding postage. Remittance must accompany order.

Names of classified advertisers using V. M. key numbers cannot be supplied. Address your inquiry to key number, care VETERINARY MEDICINE, Suite 803, Livestock Exchange Building, Kansas City 2, Missouri, and it will be promptly forwarded to the advertiser.

To assure inclusion, copy must be supplied by the 5th of the month preceding date of issue (January 5 for February issue: February 5 for March issue, etc.).

GET FAMILIAR: With all kennel blanks, forms, contracts, account sheets, records by sending $1 for Kennel Samples Kit. Dog World mo., $3 one yr., $5 two years. Judy Publ'g Co., 3323 Michigan Blvd., Chicago 16.

FOR SALE: Senior partnership in excellent large animal practice in Midwest. Gross of $53,000, with net of 47%. Excellent opportunity. Bargain price. Owner has other interests. Address Box 327, care VETERINARY MEDICINE.

FOR SALE OR LEASE: To active enterprising young man unafraid of hard work. Spacious modern small animal hospital with five acres of virgin timber as background. Located just at city limits of progressive city of 65,000 on beautiful Lake Michigan. Growing business with possibilities for large animal work. Unnecessary to purchase entire acreage. Address Box 329, care VETERINARY MEDICINE.

OPPORTUNITY: Nationally established ethical Manufacturer-distributor of veterinary pharmaceuticals offers immediate opportunity, for man qualified and/or experienced, in the production of veterinary pharmaceuticals. Address Box 330, care VETERINARY MEDICINE.

FOR SALE: Kansas Practice, 80% large animal; prosperous community; good livestock sale; nearest competition twenty-five miles. Reasonable. Selling reason—other interests. Address Box 331, care VETERINARY MEDICINE.

FOR SALE: 1955 Ranger chute in excellent condition. Used only 8 mo.; $350. Other large animal equipment available. Dr. Alvin C. Dufour, 2122 W. Franklin St., Elkhart, Ind.

WANTED: Assistant veterinarian for mixed practice in Virginia. Excellent opportunities. Living quarters available. Address Box 332, care VETERINARY MEDICINE.

WANTED: January, March, May and July, 1956 issues of VETERINARY MEDICINE. Your subscription will be advanced one month for each copy. Mail to VETERINARY MEDICINE, Suite 803 Livestock Exchange Bldg., Kansas City 2, Missouri.

WANTED: Veterinarian for small animal practice. If cooperative, partnership could follow. Apt. available if desired. Metropolitan New Jersey. Address Box 333, care VETERINARY MEDICINE.

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At the end of the government fiscal year (June 30, 1956) 479 slaughtering establishments and 641 engaged in meat processing only were operating under federal meat inspection.

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American consumers eat on the average of one egg per day. Per capita consumption for 1955 was 366, slightly less than in 1954.

Dr. D. F. M. Bunce, II has been appointed as Director of the newly formed Veterinary Division of the Chicago Pharmacal Company, Chicago, Ill.

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Daily administration of 4 to 33 mg./kg. of body weight phenothiazine to dogs gave effective control of hookworms *(Ancylostoma caninum)* in an experiment with 18 dogs artificially infected with the parasite.—Bell, R. R., *Am. Jour. Vet Res.*, 27:279, 1956.

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Smooth and Easy

You'll do better with **Oster** ®

the Veterinarian's Clipper

Animals are more docile and easy to handle when clipped with the smoother, quieter Oster. And there is a blade size for every need . . . general, plucking length clipping and surgical shaving.

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Dept. M, 5025 N. Lyd.ll Avenue
Milwaukee 17, Wisconsin, U.S.A.

Now Merck Sharp & Dohme

Sharp & Dohme, the pharmaceutical and biological products division of Merck & Co., Inc., became the Merck Sharp & Dohme Division August 1, 1956.

Merger of Merck & Co., Inc. and Sharp & Dohme, Inc. early in 1953 has made possible an enlarged program of research and developmen which has produced a growing line of medically sound products. Each professional package will soon bear the Merck Sharp & Dohme name and trademark.

Traditions and experience of two time-honored leaders in the medicinal field offer bright promise for even further accomplishments in the perfection of acceptable products for conquest of disease.

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Brucellosis is considered to be an occupational disease primarily, though in some instances it has proved to be transmissible by means other than animal contacts. It is rarely. if ever, transmitted from person to person.

▾ ▾ ▾

Bat rabies has been confirmed recently in Alabama and Oklahoma.

MASON'S New KENNEL RUNS
NOW AVAILABLE
For SMALL ANIMAL HOSPITALS
Quickly Erected - NO POSTS REQUIRED
Can be set on concrete or wood floors or directly upon the ground, joining to, or independent of Building. Composed of strong, self-supporting Fence sections and Gate Units with GATES BUILT-IN and Lockable Latches.
FREE CATALOG
Send for Free Catalog with Low Direct Factory Prices of Kennel Fences of all kinds, Kennel Doors, Cages and Hospital Equipment.
THE MASON FENCE CO., Box 77, LEESBURG, OHIO

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In the practical sense, the goal of parasite control should be reduction of parasitic forms below the disease-producing level. Eradication, an ultimate goal, implies knowledge not yet possessed and complete cooperation of all interested parties.—*M. S. Bailey, D.V.M.*

NOW!
EXCLUSIVELY FOR THE VETERINARY PROFESSION
PRO Cat Food
PRO Kennel Diet Dog Food
PRO Horse Meat WITH SEASONING Dog Food
PRO Low Protein Diet Dog Food
PEDRICK LABORATORIES, SAND SPRINGS, OKLAHOMA
Please send ☐ Samples ☐ Literature of the NEW PRO Brand Animal Foods.
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Address
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Ideal for breeders—

the dog food with

MORE BEEF!

Ideal is the perfect nutritional supplement to your dry food. It is a formulated, uniform product, unlike other supplements that vary from can to can. When you use Ideal you know *exactly* what you are feeding—and the food value never varies.

Ideal offers you exclusive advantages that will be reflected in better growth, greater spirit and appearance—result in more saleable pups at higher prices from every litter.

You see, Ideal is more completely nutritious, can for can. Ideal is a completely balanced formula based on meat and meat products from Government Inspected food animals. It is Certified a complete maintenance ration by the United States Government.

Special prices for breeders!

Write today for free folder and name of Ideal sales representative who will supply you with special breeders' prices.

WILSON & CO., INC.
Prudential Plaza, Chicago 1, Illinois

the positive answer to your disposal problems . . .

WITHOUT SMOKE, ODOR OR FLY-ASH

SILENT GLOW
"POSITIVE PRESSURE"
MODEL 40
Crematory
DESTRUCTOR

This Crematory **DESTRUCTOR** is the *only* type that is positively fulfilling every health and sanitation requirement by completely destroying small animal and poultry carcasses, kennel waste, laboratory and hospital refuse to a white ash with "positive pressure", odorless and smokeless operation without a chimney.

The Crematory **DESTRUCTOR** improves neighborhood relations with its smokeless, odorless, sparkless operation. Immediate disposal of carcasses and waste material eliminates the need for refrigerated storage equipment, unsanitary refuse cans and scavenger truck pick-up service . . . permitting "hospital clean" maintenance of premises.

The compact **DESTRUCTOR** is easy-to-use, attractively designed and completely weatherproofed for installation in outdoor locations and environments.

Write today for list of distinguished **DESTRUCTOR** owners, which includes noted Veterinarians, Government Agencies, Humane Societies, Laboratories, Pet Hospitals, Kennels and Animal Farms.

THE SILENT GLOW OIL BURNER CORPORATION

869 Windsor Street • Hartford 1, Conn.

For further details mail this advertisement with your letterhead.

New Appointees to Diamond Laboratories Staff

Recent staff appointments have been announced to the Diamond Laboratories, Des Moines, Iowa. Mr. Karl Ratcliff, a graduate

Mr. Karl Ratcliff

of Kansas University, has been named director of pharmaceuticals. Mr. Ratcliff, a registered pharmacist, was formerly instructor in Pharmaceutical Manufacturing at Kansas City University.

Mr. Norman Jungk was appointed director of biological research and control. Mr. Jungk received his B.A. degree from Kansas University in 1949 and a master degree in microbiology and biochemistry from the same institution in 1950.

▼ ▼ ▼

Management for Prevention of Parasitism

Poultry raisers visiting the University of Georgia Short Course were surprised to learn that fine broilers raised on the campus were parasite free without anthelmintic treatment. Autopsy confirmed claims and proved that thoughtful hygenic measures and practical management practices made "worming" unnecessary.

Birds were reared on concrete floors which were thoroughly cleaned, then steam cleaned, and clean litter put in between lots. Drinking fountain installations precluded run-off of surplus water. Practical precautions only were taken to prevent exposure.

This example again emphasizes that proper sanitation is a most important consideration of parasite control to say nothing of its economic aspects.

New Clinical Thermometer

with remarkable un-varying accuracy to within .1° F (one tenth degree F.) —as regularly verified by the Bureau of Standards.

- Dial Face
- All metal construction
- Rapid response
- Push button indicator lock and release
- Unaffected by sterilizing chemicals
- Safe
- Two models

Actual size of standard model.

Virtually indestructable, the amazing new Cary Clinical Thermometer has all the important features long sought after by members of the medical profession.

Standard Model only **$9.95**

Long Stem (3-11/16") Model only **$12.50**

Price includes neat plastic pocket case

Please include money order or check with order.

UNCONDITIONALLY GUARANTEED FOR 5 YEARS

CARY INSTRUMENT DISTRIBUTORS

595 Mt. Pleasant Ave., W. Orange, New Jersey

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INCREASED POTENCY

MASTITIS FORMULAE FOR THERAPY AND PROPHYLAXIS

AT REDUCED PRICES!

✳ WITH PAPAIN ADDED

dissolves clots . . . improves drainage . . . for freer access of antibiotics to infected areas

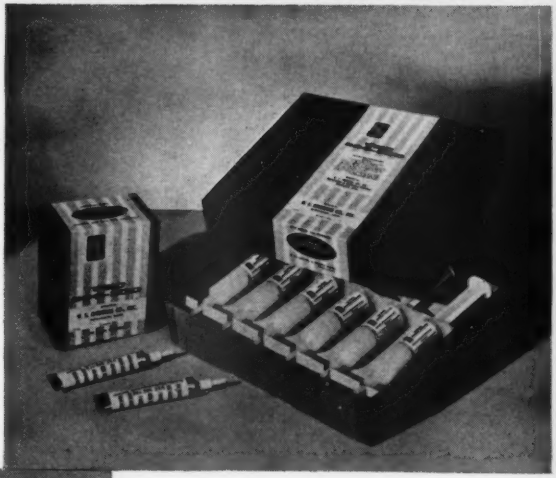
USC 500-100

with PAPAIN

A PROPHYLACTIC MASTITIS FORMULA POWERFUL ENOUGH FOR THERAPEUTIC USE

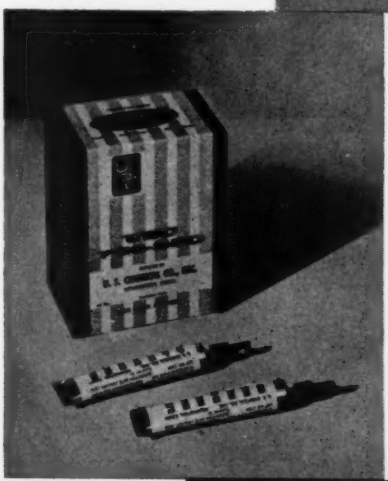
Each 11cc liquid base tube or syringe contains:
500,000 U. Cryst. Penicillin Potassium G
100 mg. Dihydrostreptomycin (as sulfate)
500 mg. Sulfamerazine, Microcrystalline
500 mg. Sulfathiazole, Microcrystalline
7.5 mg. Cobalt Sulfate
50 mg. PAPAIN

11cc TUBES	$ 3.90 per doz.	32.5¢ per tube
in 1-gross lots	41.76 per gross	29¢ per tube
in 3-gross lots	38.16 per gross	26.5¢ per tube
in 5-gross lots	36.00 per gross	25¢ per tube
11cc SYRINGES	$ 5.40 per doz.	45¢ per syringe
in 1-gross lots	57.60 per gross	40¢ per syringe
in 3-gross lots	54.72 per gross	38¢ per syringe
in 5-gross lots	52.56 per gross	36.5¢ per syringe



DISTINCTIVELY PACKAGED IN BOXES OF 12

U.S. Chemical's mastitis preparations are now colorfully packaged in new, sturdy, modern-designed boxes of twelve. Each formula is packaged in an individual color, to provide absolute control in dispensing and administering; imprinted with Doctor's name on orders of one gross or more.



USC 750-250

with PAPAIN

A POWERFUL THERAPEUTIC FORMULA AT AN UNMATCHED ECONOMY PRICE

Each 11cc liquid base tube contains:
750,000 U. Cryst. Penicillin Potassium G
250 mg. Dihydrostreptomycin (as sulfate)
500 mg. Sulfamerazine, Microcrystalline
500 mg. Sulfathiazole, Microcrystalline
7.5 mg. Cobalt Sulfate
50 mg. PAPAIN

11cc TUBES	$ 4.92 per doz.	41¢ per tube
in 1-gross lots	51.84 per gross	36¢ per tube
in 3-gross lots	47.52 per gross	33¢ per tube
in 5-gross lots	44.64 per gross	31¢ per tube

QUANTITY DISCOUNTS APPLY IN ANY COMBINATION OF USC MASTITIS PREPARATIONS

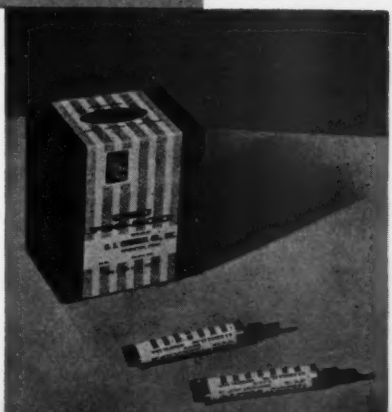
USC 750-500

with PAPAIN

EFFECTIVE THERAPY FOR STUBBORN DRY QUARTERS IN MASSIVE 28cc DOSES

Each 28cc liquid base tube contains:
750,000 U. Cryst. Penicillin Potassium G
500 mg. Dihydrostreptomycin (as sulfate)
750 mg. Sulfamerazine, Microcrystalline
750 mg. Sulfathiazole, Microcrystalline
7.5 mg. Cobalt Sulfate
50 mg. PAPAIN

28cc TUBES	$ 5.94 per doz.	49.5¢ per tube
in 1-gross lots	64.80 per gross	45¢ per tube
in 3-gross lots	59.04 per gross	41¢ per tube
in 5-gross lots	56.16 per gross	39¢ per tube



USC's famous base allows a faster release of antibiotics from the base to the infected areas—thus allowing a maximum amount of therapy in a minimum amount of time.

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SAVE 2% plus postage by enclosing check with order. SOLD TO THE GRADUATE VETERINARIAN ONLY.

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BLOOD UREA OUTFIT

for the determination of the Urea content of the blood.

An indispensable diagnostic aid in the veterinary laboratory, particularly in small animal practice.

Tests are easily and quickly performed, no special training required.

Result is read directly from special Urea Burette. No calculations required. Accurate to 4 mg. Urea per 100 cc. blood. Complete test takes only 15 to 20 minutes.

Tests also available for Sugar in blood and for Calcium/Phosphorus in blood.

Literature will be sent on request.

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Joins Armour Veterinary Laboratories

Dr. Earl F. Huffman has joined the Armour Veterinary Laboratories, Kankakee, Ill., as manager of professional relations.

Dr. Earl F. Huffman

Doctor Huffman received his D.V.M. degree from Michigan State University in 1952. He entered general practice and later joined the U. S. Department of Agriculture Animal Disease Eradication Branch in Wyoming where he did diagnostic and supervisory work.

▼ ▼ ▼

IN DOGS AND IN CATS

Octin

Relaxes Smooth Muscle Spasm of the gastro-intestinal and genito-urinary tracts

Gastritis, Colitis, Diarrhea, Cystitis, Bladder Colic, Urinary Calculi, Dysuria due to Sand, Gravel, Urethritis, Nervous Frequency of Urination.

DOSE: ¼ to ½ Octin ampule, intramuscularly.

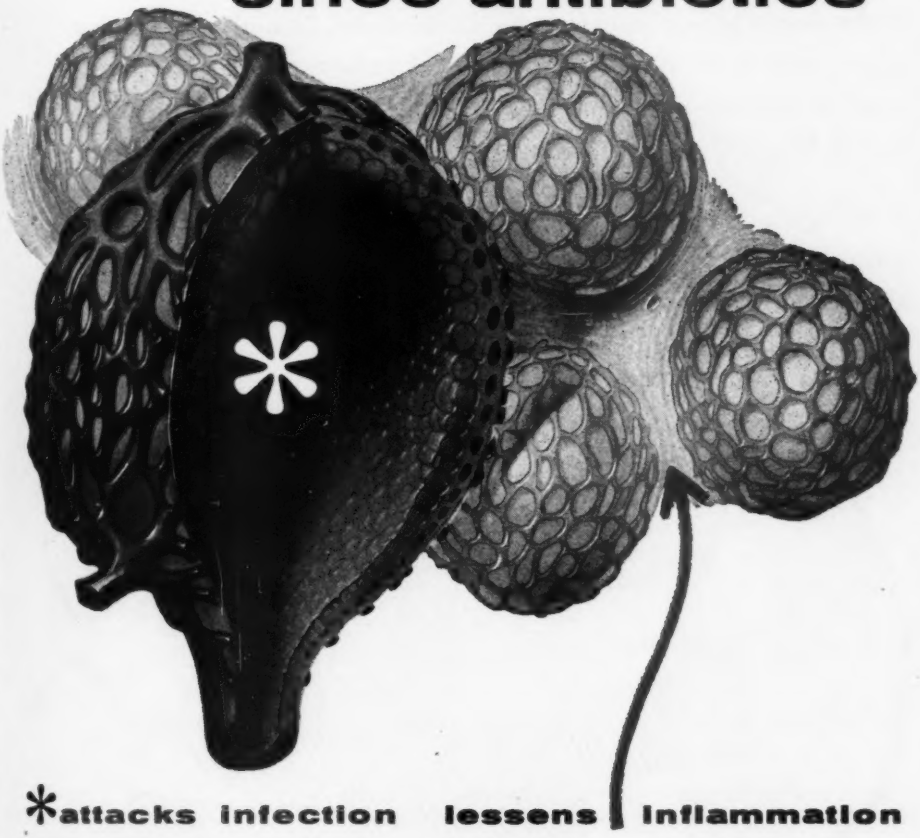
¼ to 1 Octin tablet, repeated.

Brown, W. J.: J.A.V.M.A., May, 1950. *Irwin, W. F.:* Southwestern Vet., May, 1950.

Octin®, brand of Isometheptene, E. Bilhuber, Inc.

Bilhuber-Knoll Corp. Orange, N. J.

the **greatest advance** in mastitis therapy **since antibiotics**



***attacks infection lessens inflammation**

The CORTEF* *(hydrocortisone) in* CORBIOT* *is anti-inflammatory and promotes tissue repair with minimum scarring and early return of normal milk production. The* NEOMYCIN, PENICILLIN, *and* POLYMYXIN *in* CORBIOT *form a compatible combination of antibiotics with either synergistic or additive effects for rapid elimination of harmful bacteria with little or no chance for development of resistance.*

Teatube* CORBIOT*

Available in a 10 gram, single dose, applicator Teatube

VETERINARY MEDICAL DEPARTMENT **Upjohn**

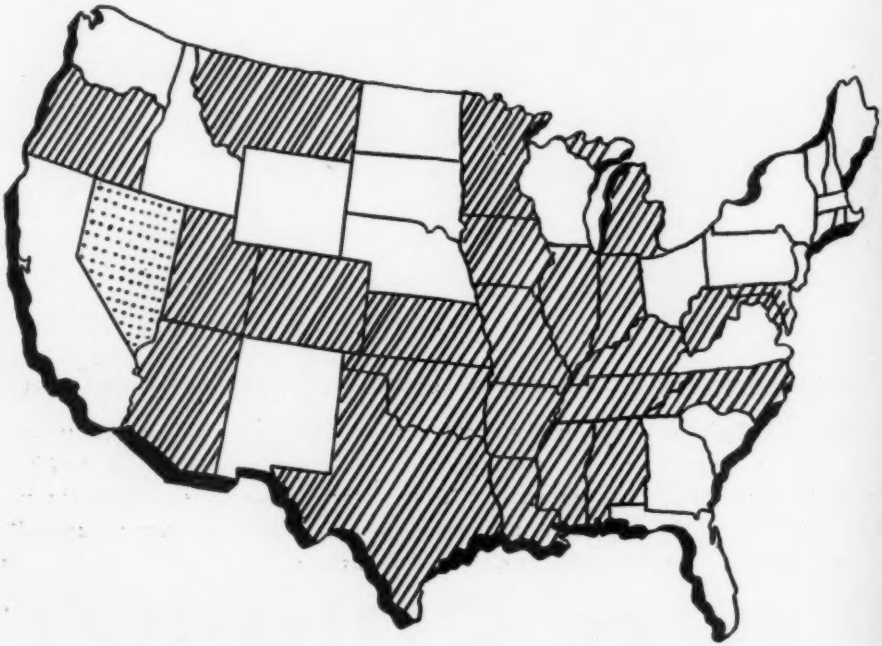
*TRADEMARK, REG. U.S. PAT. OFF.

The Upjohn Company, Kalamazoo, Michigan

One-half the states now participate

Professional group insurance by Continental Casualty Company now protects the heads of families of veterinarians throughout most of our nation, thanks to the efforts of those who pioneered in this field.

Today "Silent Partner" insurance, with ten years of experience, protects veterinarians in 24 states that have accepted the plan. Moreover, scores of veterinarians, located in other parts of the nation enjoy this unparalleled protection.



Silent Partner Associates, Inc.
Veterinary Department, P. O. Box 824
Evanston, Illinois — AGP 10531-TP 10595

a single-dose vaccine against canine distemper

VIROVAX*

*Trade name for: Virovax, Canine Distemper Vaccine, Modified Live Virus (Chick Embryo Origin, Vacuum Dried) (P.-M. Co. Bio. 668).

In healthy, unexposed puppies, Virovax will produce a complete cell block against distemper in two days. This effect persists until true immunity has been established.

It is satisfactory to vaccinate dogs with Virovax at 3 months of age, when a single dose is sufficient. In hospitals or kennels, where earlier exposure may be anticipated, puppies should be vaccinated shortly before or soon after weaning, with a second dose at 4 to 6 months of age.

The dose for all dogs is 2 cc., injected subcutaneously, within one hour after restoration of the vaccine. As with all immunizing procedures, normal healthy animals respond best.

PITMAN-MOORE CO. DIVISION **ALLIED LABORATORIES, INC.** INDIANAPOLIS

SPECIAL
DAIRMOL DUSTING POWDER
FOR GRANULAR VAGINITIS

Antiseptic **Astringent**

"THE DAIRMOL WAY"

Compounded under the direction of veterinarians of exceptional experience. Highly recommended by leading herdsmen as the best treatment for the purpose.

Also mfrs. of LIQUID Dairmol Antiseptic and Deodorant.

DALARE ASSOCIATES

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Lower Conception Rate in Drought Areas

With drought conditions still largely prevalent in many of the great plains states, reports of low conception rates in cattle herds are frequent. Much of this may be ascribed to malnutrition. We have been informed that a marked improvement in the conception rate under condition of drought may be noticed if some pea-green alfalfa is fed as supplement.

LOOK
to us for
PHENOTHIAZINE AND PHENOTHIAZINE-LEAD ARSENATE

POWDER, wettable: 1#—$8.50/dz., 10#—$6.30, 25#—$15.50, 100#—$52.00, 150#—$73.50

BOLUSES: 12½ gm. $3.35/hundred, 8 gm. $2.90

WHEAT GERM OIL: $13.60/gal., $3.60/qt., $2.10/pt.

SODIUM PROPIONATE NF: 5#—$3.60, 10#—$6.75, 25#—$15.75

SULFA DRUGS: Powder, tablets & boluses.

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Manufacturing Chemists — Since 1939
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VETERINARY CHUTE
The choice of leading veterinarians from coast to coast! The only chute in the world with front and side opening!
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New Rustless Dairy Scale Keeps its Accuracy

A new kind of dairy scale, built entirely of stainless steel—even to the mainspring—resists rust and retains its accuracy under rugged conditions. This new scale is calibrated in tenths of pounds for exact reading and record keeping. It can easily be cleaned like a dairy utensil.

This rugged scale affords an accurate check on the milk production of each cow. It's also handy for weighing feed and helps show up cows that don't pay for their keep. A handy adjustable weight indicator on the scale can be offset to compensate for the weight of the milk pail or feed bucket.

The new all stainless steel dairy scale weighs up to 60 pounds of milk. It is a product of Babson Bros. Co. of Chicago, builders of the Surge milker.

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Biochemist Casimir Funk in 1911, isolated a substance which when added to a synthetic diet of experimental animals prevented development of signs of malnutrition. He believed it related to amino acids and named the substance "vitamine."

for 18 months

"...almost every known treatment failed..."

then

DRAMATIC IMPROVEMENT IN JUST 19 DAYS...

BEFORE SELEEN—Hound had suffered from demodectic mange almost from birth. In spite of therapy with almost every type of skin medicament, condition grew steadily worse. Photo taken four days before first SELEEN treatment.

AFTER SELEEN—Marked improvement shows in elimination of mange mites and lesions, clearing of affected areas, regrowth of haircoat. Photo taken 19 days and three SELEEN treatments after first picture.

And *you* can get equally fast control of nonspecific dermatoses and ectoparasitic skin conditions in dogs and cats the same way—by treating these pets

WITH

SELEEN®

In clinical studies, SELEEN Suspension brought complete control in 87%, definite improvement in another 11%, of all nonspecific dermatoses cases. Moreover, you'll find SELEEN

- *relieves itching and scratching,* usually with the first treatment.
- *cleanses skin and haircoat,* removes tissue debris.
- *kills ectoparasites,* such as fleas, lice, demodex mange mites.
- *improves appearance,* makes coat glossier, healthier looking.

Easy to apply, safe to use, SELEEN takes only 10 or 15 minutes per treatment. Try it. Order from Abbott Laboratories, North Chicago, Illinois; your Abbott salesman, or your distributor.

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presents a *New* concentrate
HALIMIDE

...A COMPLIMENT TO ANY INSTRUMENT

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HALIMIDE is . . .
RAPIDLY BACTERICIDAL
NON-SELECTIVE
TUBERCULOCIDAL WHEN DILUTED WITH ALCOHOL

- **NON-CORROSIVE**
  NO ANTI-RUST TABLETS TO ADD
- **STABLE**
  NEED NOT BE CHANGED FREQUENTLY
- ***INEXPENSIVE***
  1 ounce makes 1 gal. of solution

LIST PRICE—4 oz. bottle.....$2.50
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PARKER, WHITE & HEYL, INC.
Danbury Connecticut

HALIMIDE and your INSTRUMENTS
...THEY COMPLIMENT EACH OTHER

MEETING CALENDAR

Oklahoma Conference for Veterinarians. School of Veterinary Medicine, Oklahoma A & M College, Stillwater, September 27-28, 1956. A. L. Malle, Department of Veterinary Pathology, chairman.

Eastern Iowa Veterinary Association. Annual meeting. Hotel Montrose, Cedar Rapids, Ia., October 4-5, 1956. Forrest B. Brutsman, Traer, secretary.

University of Missouri. Thirty-second annual Short Course for graduate veterinarians. Columbia, Mo., Oct. 1-2, 1956. Dr. Cecil Elder, chairman.

Purdue University. Forty-fourth Annual Short Course for Veterinarians. Purdue University, Lafayette, Ind., Oct. 3-5, 1956. L. M. Hutchings, chairman.

South Dakota Veterinary Medical Association. Annual meeting. Hotel Cataract, Sioux Falls, S. Dak., Oct. 4-5, 1956. Dr. J. L. Noordsy, Marion, S. Dak., secretary.

University of Illinois. Thirty-seventh annual Conference and Extension Short Course for Veterinarians. University of Illinois, Urbana, Ill., October 12, 1956. L. E. Boley, University of Illinois, College of Veterinary Medicine, chairman.

American Veterinary Medical Association. Annual meeting. Municipal Auditorium, San Antonio, Tex., October 15-18, 1956. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago, Ill., executive secretary.

Southern Veterinary Medical Association will hold their 1956 Annual meeting in conjunction with the American Veterinary Medical Association convention at San Antonio, Texas, Oct. 14-18, 1956. Dr. A. A. Husman, Raleigh, N. C., secretary.

Sixth annual veterinary symposium on The Newer Knowledge About Dogs. Kankakee, Illinois Civic Auditorium, October 24, 1956. Dr. Robert Graham, University of Illinois School of Veterinary Medicine, chairman.

Interstate Veterinary Medical Association, Annual Meeting. Martin Hotel, Sioux City, Iowa, October 30-31, 1956. K. W. Smith, 510 W. 19th St., Sioux City, Iowa, secretary.

Midwest Small Animal Association 19th Annual Meeting and A.A.H.A. Regional Meeting. Hotel Burlington, Burlington, Iowa, November 18-19, 1956. J. Porter Coble, 2828 S. MacArthur Blvd., Springfield, Ill., secretary.

Washington State Veterinary Medical Association. Annual meeting. Davenport Hotel, Spokane, Sept. 21-22, 1956. P. J. Pfarr, 6306 N. Wall, St. Spokane, general chairman.

New York State Veterinary College. Forty-ninth Annual Conference for Veterinarians. Cornell University, Ithaca, N. Y., Jan. 2-4, 1957. W. A. Hagan, dean.

Indiana Veterinary Medical Association. Seventy-third annual Convention. Hotel Severin, Indianapolis, Ind. January 16-18, 1957. Dr. L. M. Borst, 3315 Shelby, Indianapolis, Ind., secretary.

(Continued on page LIV)

for superior treatment of inflammatory diseases

STERANE®

BRAND OF PREDNISOLONE

Intramuscular-Veterinary

Arthritic Diseases Sterane is 4 to 5 times more potent than hydrocortisone.

Eye Diseases "Following intramuscular injection, prednisolone penetrated the eye more effectively than prednisone."[1]

"Prednisolone...is more potent than all other steroids."[2]

Severe Systemic Infections* "Combats toxemia ... shock ... inflammatory complications ... complements the body's own effort to combat stress factor in disease."[3]

*TERRAMYCIN® (brand of oxytetracycline) or TETRACYCLINE-VET should be administered in conjunction with Sterane in susceptible infections.

Supplied: Vials of 10 cc. Aqueous Suspension, each cc. containing 10 mg. crystalline prednisolone. Also available: Tablets 5 mg., bottles of 20 and 100; 1 mg., bottles of 100.

1. Leopold, L. H.: Tr. Am. Acad. Ophth. 59:771, 1955. 2. King, J. H., and Weimer, J. R.: Arch. Ophth. 54:46, 1955. 3. Selye, H.: J. Chronic Dis. 2:583, 1955.

Pfizer

Department of Veterinary Medicine • PFIZER LABORATORIES, *Division, Chas. Pfizer & Co., Inc.*, Brooklyn 6, N. Y.

Adrenomone

ACTH

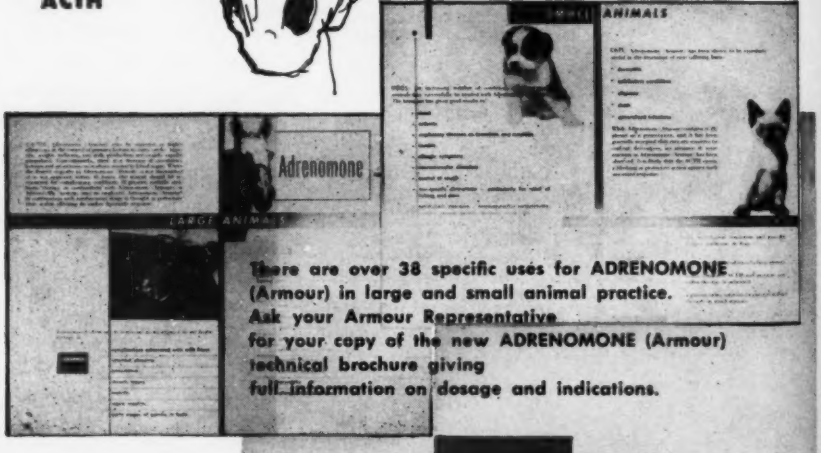
The therapeutic significance of ADRENOMONE (Armour) derives from the fact that the adrenocortical hormones are vital factors in the animal's ability to withstand and overcome stress.

When used properly in the recommended doses, ADRENOMONE (Armour) is a safe drug in animals.

By stimulation of the adrenal cortex to secrete its entire spectrum of hormones, ADRENOMONE (Armour) acts to restore the physiological balance of the body by maintaining cellular integrity.

ACB_{12}
DYNAMONE
ADRENOCILLIN
D-40

These Armour products also contain **ACTH**

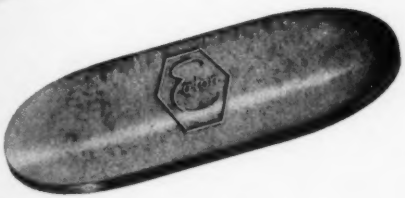


There are over 38 specific uses for ADRENOMONE (Armour) in large and small animal practice. Ask your Armour Representative for your copy of the new ADRENOMONE (Armour) technical brochure giving full information on dosage and indications.

A Division of Armour and Company

ARMOUR **Veterinary Laboratories**
Kankakee, Illinois

NEW "FAR SUPERIOR" TREATMENT FOR RETAINED PLACENTA PREVENTS SEQUELAE; MAINTAINS FERTILITY



Therapeutic failure, frequently encountered in retained placenta, can be prevented – with new FUREA Veterinary. FUREA successfully combines the potent wide range bactericidal and deodorizing action of the nitrofuran, FURACIN® (brand of nitrofurazone), with the cleansing action of urea.

In practically every case of retained placenta, treatment with FUREA has produced quick improvement of the general condition of the cow with lessening or elimination of malodor. Fertility rate remained unimpaired in over 90% of treated cows.* FUREA Veterinary boluses disintegrate readily in the uterus, assuring rapid and even distribution of active ingredients. FUREA boluses are nonirritating and nontoxic.

Supplied: Each bolus contains 0.12 grams of FURACIN and 12 grams urea. Bottle of 25. Available through your professional veterinary distributor.

Dose: Two boluses inserted into the recently pregnant horn. One bolus may be placed in the non-pregnant horn.

Furea T.M.
VETERINARY

*Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. In Press.

NITROFURANS – a *new* class of antimicrobials – neither antibiotics nor sulfonamides.

EATON LABORATORIES
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POLYOTIC®

COMPOUND MASTITIS OINTMENT *Lederle*

For professional use and dispensing in Mastitis Control, use an exclusive formula available to veterinarians only

One of eleven dosage forms of POLYOTIC® Tetracycline developed by Lederle for the veterinarian . . . a part of the Red Line of Professional Products for use under your supervision only.

In ¼ ounce applicator tubes. Each tube contains:

Tetracycline HCL	200 mg.
Neomycin	100 mg.
Dihydrostreptomycin	100 mg.
Procaine Penicillin G	200,000 units

. . . in a stable, nonirritating ointment base. May be used in lactating and non-lactating cows.

Lederle

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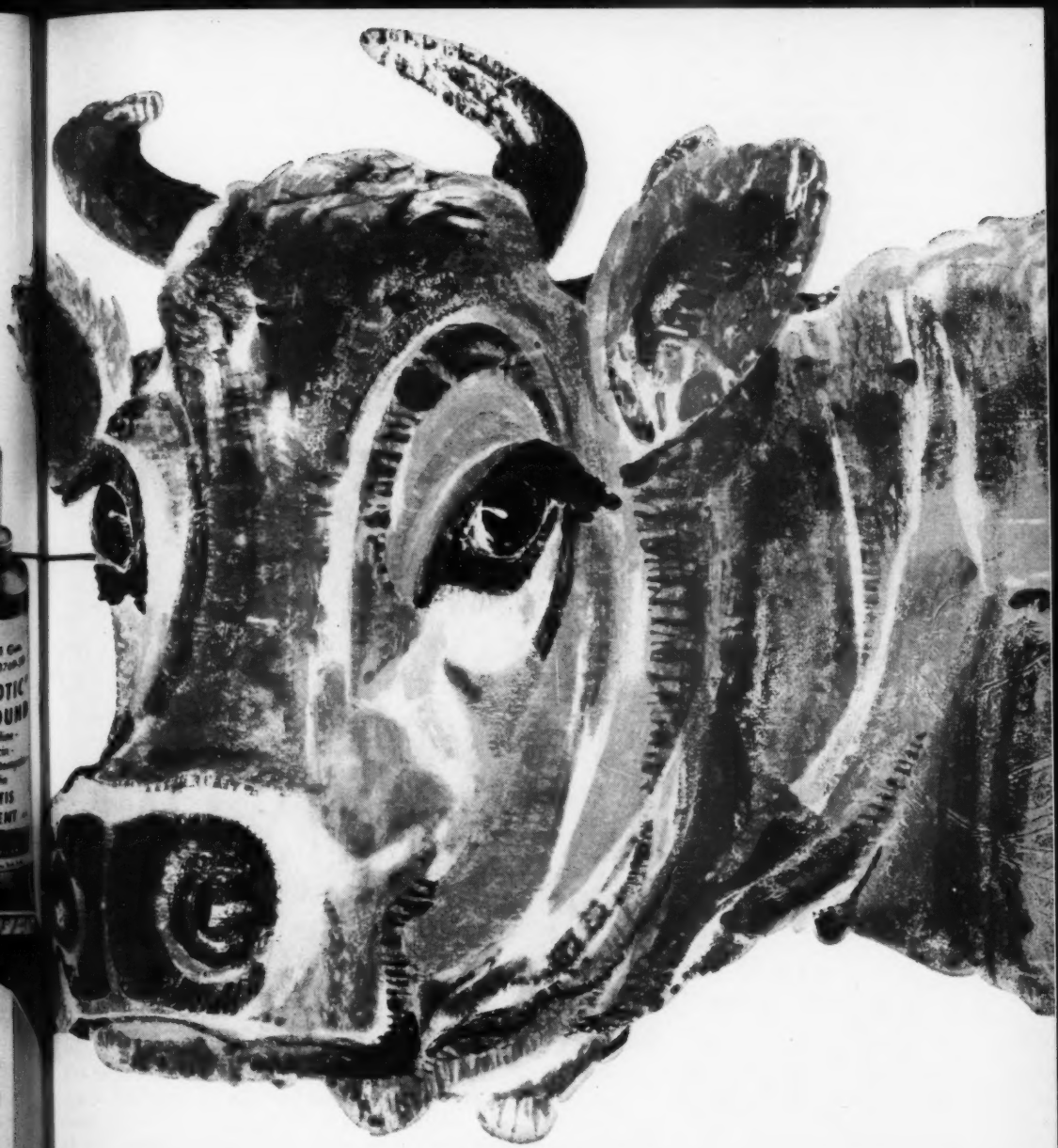

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POLYOTIC INTRAMUSCULAR:
100 mg.-500mg.-1 Gm.-5Gm.
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100 mg., 25's-100's; 250 mg., 16's-100's
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POLYOTIC POWDER 2%: 35 Gm.
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5 doses (25 cc.)
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LEPTOSPIRA CANICOLA-ICTEROHEMORRHAGIAE BACTERIN
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Like all Squibb products sold to veterinarians only, the five new biologicals are available through your wholesaler, or from your favorite veterinary supply house. For further information about these or other Squibb veterinary products write SQUIBB, *Veterinary Products Department*, 745 Fifth Avenue, New York 22, N. Y.

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...good immunity against canine distemper and infectious hepatitis at the same time with a single injection. Sin-jex is the first successful combination of a vacuum dried, modified live virus distemper fraction (chick embryo origin) with a killed virus hepatitis fraction as diluent. Sin-jex is instantly reconstituted into a fine homogenous suspension which passes easily through a 22 gauge needle, and produces immunity in less than 2 weeks. *Supplied in* 6 x 3 cc.—1 dose vials.

RABIES VACCINE

...both phenolized and chick embryo origin, for positive immunization against rabies for a period of one year. *Supplied in* 5 x 3 cc.—1 dose vials, 30 cc. vials and 50 cc. vials.

ANTI CANINE DISTEMPER SERUM and ANTI INFECTIOUS HEPATITIS SERUM

...immediate passive immunity against canine distemper and infectious hepatitis. *Supplied in* 100 cc. vials.

CANINE DISTEMPER VACCINE

...modified live virus, chick embryo origin, for immunization against distemper in dogs. *Supplied in* 6 x 2 cc.—1 dose vials.

FEMULGEN

...single-injection vaccine for immunization against cat distemper (feline infectious enteritis, malignant panleucopenia, infectious feline agranulocytosis, etc.) Femulgen is a homologous vaccine, prepared from the tissues of young susceptible cats innoculated with virulent feline distemper virus. This virus is extracted, inactivated wth formalin and suspended in an oil emulsion. *Supplied in* 5 x 1 cc.—1 dose vials, with disposable syringe.

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Down the millenia the cry "mad dog" has acquired a history-laden freight of superstition that makes normal people panic when rabies is present and forget it when it is absent. Public health officers know only too well the difficulties of coping with these two faces of the coin; overreaction in crises and under-support of prevention. — *Ernest Tierkel, D.V.M., M.P.H.*

▾ ▾ ▾

Meetings

(Continued from page XLVI)

Michigan State University. Thirty-fourth annual Post Graduate Conference for Veterinarians. College of Veterinary Medicine, Michigan State University, East Lansing, Mich., Jan. 22-23, 1957, C. F. Clark, dean.

Iowa Veterinary Medical Association. Annual Meeting. Hotel Fort Des Moines, Des Moines, Iowa, January 22-24, 1957. F. B. Young, Waukee, Iowa, secretary.

California State Veterinary Medical Association. Midwinter Conference. School of Veterinary Medicine, University of California, Davis, January 28-30, 1957. Charles S. Travers, 3004 16th Street, San Francisco, Calif., executive secretary.

Minneosta State Veterinary Medical Society. Annual Meeting. Radisson Hotel, Minneapolis, Minn., February 4-6, 1957. B. S. Pomeroy, Minnesota School of Veterinary Medicine, St. Paul 1, Minn., secretary-treasurer.

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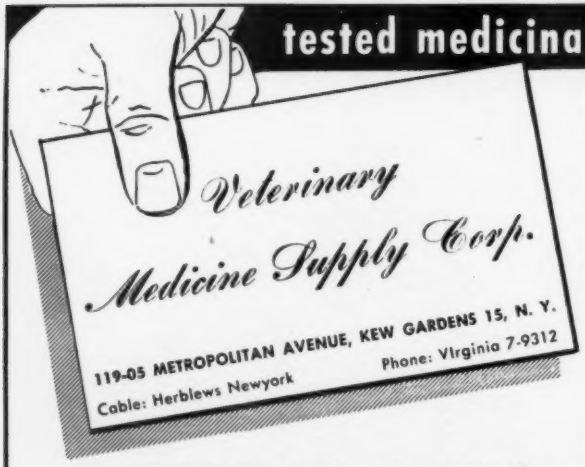

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50,000 units 100's 1.55
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100,000 units 500's 12.00
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Procaine Penicillin G in Aqueous Suspension, 3 million units 10 cc. drain-free vial. Nationally known brands. 26¢

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Fortified Penicillin (400,000 units) with .05 Gm. Dihydrostreptomycin in dry powder for aqueous injection. 1 dose vial 24¢ 5 dose vial 69¢

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- Provides 20 vitamins and minerals in optimum nutritional levels.
- Vitamins are stable—"A" factor is gelatin-coated and "D" factors are wax coated for high stability. Special anti-oxidizing additive helps maintain the stability of all vitamins.
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Procaine Penicillin G	1,000,000 Units
Streptomycin Sulfate (as base)	3.0 gms.
Riboflavin	400.0 mgs.
Calcium Pantothenate	600.0 mgs.
Niacin	1,400.0 mgs.
Vitamin B_{12}	1,000.0 mcgs.
Vitamin A (palmitate oil)	100,000 U. S. P. Units
Vitamin D_3	100,000 I. C. Units

(In an inert base)

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EACH POUND CONTAINS:

Vitamin A	110,000 U. S. P. Units
Vitamin D_2	200,000 U. S. P. Units
Vitamin D_3	50,000 I. C. Units
Vitamin B_{12}	60 mcgs.
Terramycin Hydrochloride	50 mgs.
Manganese Sulfate	280 mgs.
Cobalt Sulfate	140 mgs.
Iron Sulfate	3 gms.
Copper Gluconate	300 mgs.
Calcium Phosphate	9.1 gms.

(In a wettable grain meal base with soy bean oil)

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Potassium Guaiacol Sulfonate	20%
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Potassium Dichromate	10%

(In a flavored sodium chloride base)

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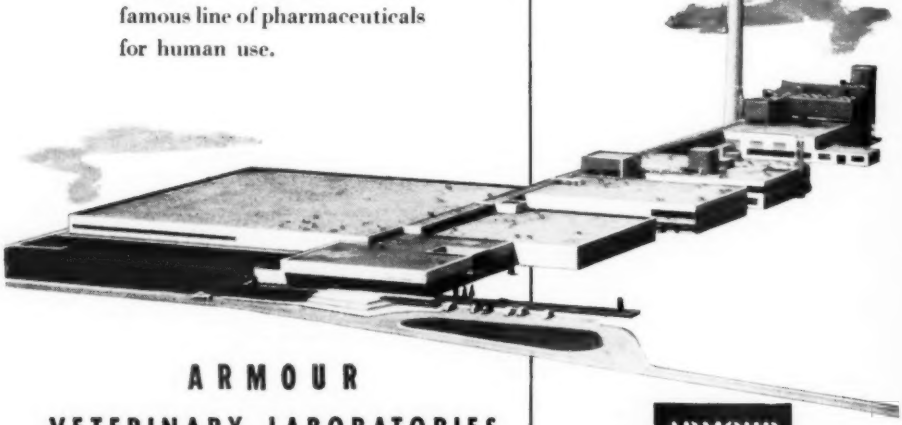

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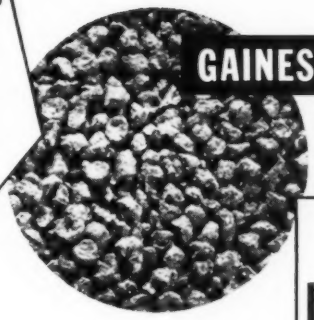

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Clarence E. Hammonds, Girard, Ill., KCV '15, March 7, 1956.

A. R. B. Richmond, Toronto, Ont., ONT '11, Dec. 18, 1955.

J. L. Robinson, Des Moines, Iowa, CVC '14, March 29, 1956.

Balbino Sanz, Satiago, Chile, MAD '07, Nov. 30, 1955.

Edward H. Schirmer, St. Joseph, Mo., ST JOS '09, Dec. 16, 1955.

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Thomas A. Schneekloth, Sr., Lodi, Wis., CVC '02, Jan. 9, 1956.

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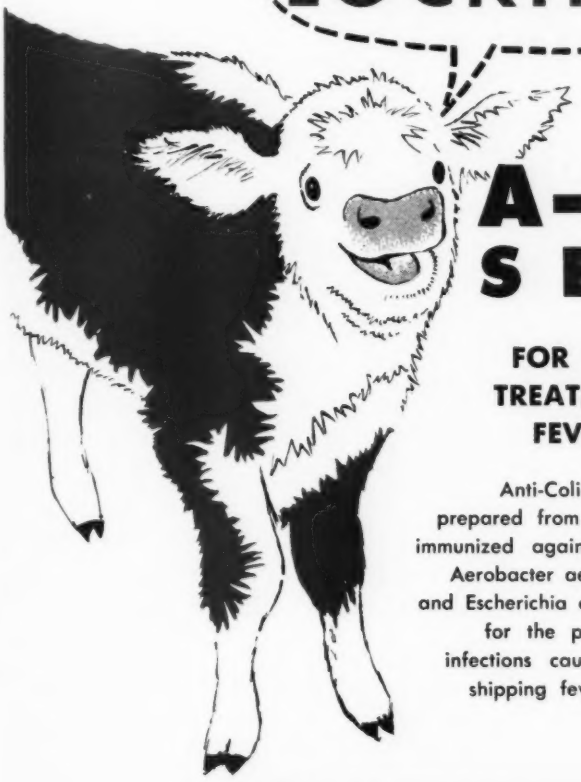

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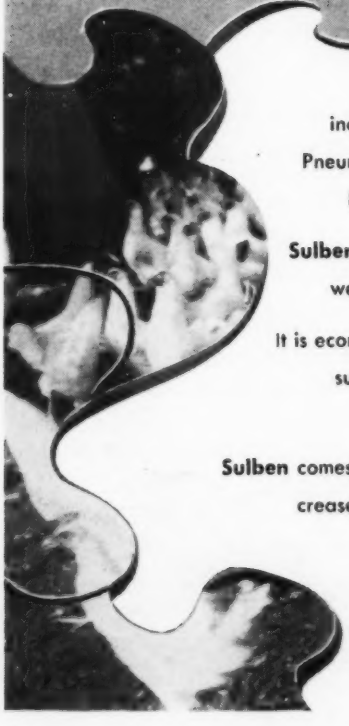

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